

Exhibit Z - Expert Report of Jeffrey Tomberlin

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February 4, 2021

RE: Lobato v. LVMPD, et al., Civil Action 2:19-CV-1273 (D Nev.)

I. Basis for Expert Opinion, Qualifications and Methodology

A. Basis for and Scope of Expert Opinion

1. I have been retained by Plaintiff's counsel in the case *Kirstin Blaise Lobato v. Las Vegas Metropolitan Police Department, et al.*, Civil Action 2:19-CV-1273 (D Nev.) as an expert in forensic entomology to provide an opinion on the lack of entomological evidence as related to the remains of Duran Bailey and suspected time of availability for colonization. My opinions are based on all of the materials that I have reviewed, which are listed below, as well as my knowledge and experience in the field. My opinions are expressed to a reasonable degree of professional certainty. I reserve the right to alter my opinions or form additional opinions in this case based on disclosure of further information and/or documents.

B. Expert Qualifications

2. I am an expert in forensic entomology. My educational background includes a Bachelor of Science in Biological Sciences at the University of Georgia, a Master of Science in Entomology at Clemson University, and a PhD in Entomology at the University of Georgia. I have been a Board Certified Forensic Entomologist since 2006.

3. I am a Professor, AgriLife Research Fellow, and Presidential Impact Fellow in the Entomology Department at Texas A&M University. I started my employment at Texas A&M University as an assistant professor and extension specialist in the Entomology Department in 2002. I have worked in the Entomology Department of Texas A&M University continuously for the last eighteen years, and have divided my time between research, teaching, and service.

4. As a faculty member at Texas A&M University, I have taught various classes, including classes on forensic and investigative science, forensic entomology, anatomy and physiology, biology, and science and the law.

5. From 2016 through 2020, I served as the Director of the Forensic & Investigative Science Program at Texas A&M University. From 2014 through 2015, I served as Associate Director of the Program. I have also served as the Director of an affiliate site of the NSF-NIJ Center for Advanced Research in Forensic Science from 2017 to 2018, and the Co-Director of the site from 2018 through the present.

6. I am currently the Director of the Forensic Laboratory for Investigative Entomological Sciences at Texas A&M University. As part of that role, I oversee all research done at the lab.

7. One of my two primary areas of research is understanding the biology of arthropods that colonize human remains in order to assist law enforcement personnel in estimating the time of colonization of living, or deceased, individuals. I have carried out my research in both laboratory and field-based studies.

8. I have made hundreds of professional presentations related to forensic entomology. I have also published three books related to forensic entomology and 200+

professional papers, including in peer-reviewed journals like Forensic Science International, Journal of Forensic Sciences, Journal of Medical Entomology, and Journal of Legal Medicine. I also have participated numerous times in the peer-review process to evaluate articles written by others for publication.

9. I am a member of several professional organizations related to forensic entomology, including the European Association of Forensic Entomology, the North American Association of Forensic Entomology, the American Academy of Forensic Sciences, and the Entomological Society of America. I have served as the chair of the pathology/biology section of the American Academy of Forensic Sciences, and as the president of the North American Forensic Entomology Association. I have also served as the chair of the American Board of Forensic Entomology. Additionally, from 2014 to 2017, I served on a subcommittee of the National Committee of Forensic Sciences, which evaluated the quality of science used in forensic investigations.

10. In 2019, I received an award for Outstanding Achievement in the Forensic Life Sciences from the American Academy of Forensic Sciences.

11. I have also conducted case work as a consultant related to my expertise in forensic entomology. These cases include death, abuse, and neglect investigations for both criminal and civil cases. My role specifically has been to assess arthropod activity or lack thereof associated with decomposing remains or with living individuals. To date, I have acted as a consultant for more than 150 cases.

12. I have been qualified many times as an expert witness in forensic entomology, as detailed in the attached list of cases in which I have served as an expert witness.

13. My qualifications are more fully detailed in my curriculum vitae, which is attached to this report.

14. My compensation rate for providing services as an expert forensic entomologist is \$300/hour.

C. Methodology

15. This report is based on reviewing documents and photographs relating to the death of Duran Bailey and the investigation into his death, including:

- Photographs from the crime scene of the Duran Bailey homicide
- The autopsy report for Duran Bailey and photographs from the autopsy
- The crime scene investigation report for the Duran Bailey homicide
- The Officer's Report for the Duran Bailey homicide
- Weather data from July 8, 2001

16. In addition to the discovery materials listed above, my opinions in this case are based upon my over 25 years of knowledge, experience, training, and expertise in the field of entomology.

II. Overview of Blowfly Activity and the Scene

17. Blow flies, and other arthropods, are attracted to human and other animal remains, and are generally one of the first insects to colonize a human body after death. Blow flies will be especially attracted to remains if blood or wounds are present.

18. Generally, within minutes of arriving to a body, blow flies can begin laying eggs. Blow flies lay eggs in large clumps that are easily visible to the naked eye and adults will usually lay their eggs in open wounds and orifices of the body.

19. The eggs will then hatch into larvae, which feed on the remains.

20. Blow flies are typically active in the temperature range between 45 and 95 degrees. Blow fly activity is affected by wind and rain during daylight hours.

21. Blow flies are diurnal, meaning they are active during daylight hours and inactive at night.

22. Blow fly colonization may be delayed if a body is located inside an enclosed structure such as a house, but blow flies are adept at reaching human or other animal remains.

23. When conditions are optimal, there will be signs of blow fly activity with a decomposing body within at least a few hours of death, but usually within minutes.

24. The general characteristics of decomposition in terms of arthropod activity are similar in regions around the world.

25. Duran Bailey's body was found in an outdoor dumpster enclosure in the parking lot of the Nevada State Bank at 4240 W. Flamingo Road in Las Vegas, Nevada. The Las Vegas Metropolitan Police Department was notified of this through an emergency call to dispatch at approximately 10:30 pm on July 8, 2001.

26. The top of the dumpster enclosure was covered by chain-link fencing with wide openings.

27. Duran Bailey's body was covered with loose garbage.

28. Nothing at the scene—including this fencing or garbage—would have created any impediment to blow fly attraction to, or activity associated with, Duran Bailey's body. If anything, the trash present on Duran Bailey's body would have provided blow flies with protection from the sun during the hottest parts of the day.

29. In Las Vegas on July 8, 2001, the temperature ranged from 73 degrees Fahrenheit to 95 degrees Fahrenheit. Winds were low, and there was no precipitation. In other words, the conditions were optimal for blow fly activity.

30. I would expect blow flies, or other carrion-frequenting arthropods, to have been active during the daylight hours on July 8, 2001, and possibly to continue to have been active even during the hottest part of that day given the location, and condition, of the remains.

31. I reviewed photographs of the body of Duran Bailey. Duran Bailey's body would have been highly attractive to blow flies due to the volume of blood and the number of wounds on the body.

32. If the body of Duran Bailey had been present in the dumpster enclosure during daylight hours in the same condition as it appeared in the photographs, I would have expected to see clear evidence of blow fly or other arthropod activity.

33. I did not see any evidence of arthropod, including blow fly, activity on the body in any of the photographs I reviewed, including in areas that would have been especially attractive to blow flies like the mouth, eyes, nose, and many open wounds or in association with the blood or garbage.

34. Blow flies, blow fly eggs, or other forensically relevant arthropods, were not observed in photographs.

35. I did not see any mention in the autopsy report of any blow flies, or other forensically relevant arthropods, on Duran Bailey's body.

36. I have reviewed many autopsy reports in the course of my work as a forensic entomologist. In my experience, if blow flies, blow fly eggs, or other arthropods

are present on a body during an autopsy, that presence is documented in the autopsy report.

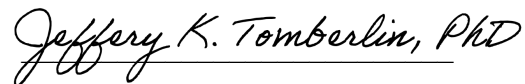
37. Sunset in Las Vegas, Nevada occurred at 8:01 pm on July 8, 2001.

III. Conclusions

38. If Duran Bailey's body had been in the trash enclosure from prior to sunrise through sunset, I would have expected to see blow fly, or other arthropod, activity.

39. I testified to these opinions under oath at an evidentiary hearing in Ms. Lobato's post-conviction proceedings, on October 9, 2017. I incorporate by reference my testimony from that hearing, a copy of which is attached to this report.

Executed on: February 4, 2021

A handwritten signature in black ink that reads "Jeffery K. Tomberlin, PhD". The signature is written in a cursive style with a horizontal line underneath the name.

Jeffery K. Tomberlin, PhD, D-ABFE

List of Testimony at Deposition or Trial by Jeffery Tomberlin

Lobato Post-Conviction Case (Nevada)
Master Case 5:15-CV-00013-BR (North Carolina)
Case No. 4:18-CV-00072-RWS (Missouri)
Case No. CR15-1496 (Nevada)

1 MR. SULTAN: Thank you, your honor. Petitioner calls
2 Dr. Jeffrey Tomberlin.

3 THE COURT: Bring him in.

4 THE BAILIFF: Doctor, if you can remain standing.
5 Please raise your right hand to be sworn in by the clerk.
6

7 DR. JEFF TOMBERLIN,
8 [having been called as a witness and being first duly
9 sworn testified as follows:]

10 THE WITNESS: I do.

11 THE CLERK: Thank you. Please be seated. State and
12 spell your first and last name for the record.

13 THE WITNESS: Sure. My name is Jeff Tomberlin.
14 J-e-f-f T-o-m-b-e-r-l-i-n.

15 MR. SULTAN: May I inquire, your Honor?

16 THE COURT: Yes.

17 MR. SULTAN: Thank you.
18

19 DIRECT EXAMINATION

20 BY MR. SULTAN:

21 Q Good -- good afternoon, Doctor.

22 A Good afternoon.

23 Q Doctor, what do you do for a living?

24 A I'm an associate professor in AgriLife research

1 fellow with the department of entomology at Texas A&M
2 University.

3 Q You said you worked in the department of entomology.
4 What is entomology?

5 A Entomology is the study of insects and their
6 relatives and their importance to human society.

7 Q And you -- you said that you work at Texas A&M. How
8 long have you been working at Texas A&M?

9 A 15 years.

10 Q And what are your positions -- what possessions do
11 you hold as Texas A&M?

12 A I'm an associate professor and AgriLife research
13 fellow.

14 Q And what -- let's start with the AgriLife research
15 fellow. What is the AgriLife research fellowship?

16 A It's a recognition for a level of research that
17 is above most within the college of agriculture.

18 Q And how does one get an AgriLife research fellowship?

19 A You're nominated for it.

20 THE COURT: Are you saying agro-life?

21 MR. SULTAN: Yes. A-g-r-o.

22 THE WITNESS: A-g-r-i-l-i-f-e.

23 BY MR. SULTAN:

24 Q And who nominated you for that?

1 A My department.

2 Q And how many are awarded each year?

3 A At most, two.

4 Q You mentioned that you are -- let me ask you this:

5 Are you associated with the forensic investigation science
6 program?

7 A I am.

8 Q And what is that?

9 A That is a four-year degree program at Texas A&M
10 University of which I'm the director.

11 Q Okay. As director, what were your responsibilities?

12 A My responsibility is to make sure the program
13 remains in compliance within the forensic education
14 program's accreditation commission and that our program
15 meets the university requirements for degree
16 matriculation.

17 Q What's the purpose of the forensic investigative
18 science program?

19 A So what we do is we bridge science with
20 forensics. We teach students about the basic sciences and
21 then how that information is applied within criminal
22 investigations.

23 Q You also mentioned that you're an associate professor
24 at Texas A&M. What are your responsibilities as an associate

1 professor?

2 A There are three primary responsibilities:
3 research, teaching, and service.

4 Q And I'm sorry. The third one was service?

5 A Yes.

6 Q Let's talk -- let's talk about your teaching
7 responsibilities. How much time -- how much of your time is
8 divided between research and teaching?

9 A On paper, 35 percent toward teaching, 65 percent
10 towards research.

11 Q In reality?

12 A 100, 100.

13 Q So as far as your 100 percent teaching
14 responsibilities go, what -- do you teach any courses at Texas
15 A&M?

16 A I do.

17 Q And what are those courses?

18 A I teach a seminar course on the forensic science.
19 And I also teach a course on science and law.

20 Q And you mentioned that you do research as well.
21 That's one of your responsibilities.

22 What -- well, where do you conduct your research?

23 A Globally.

24 Q Do you have a specific location at the university you

1 teach -- you conduct research?

2 A Well, I have a research facility where I do
3 research, but I also do a lot of work at the decomposition
4 facility at Texas State University.

5 Q And what does your research focus on?

6 A In a nutshell, I study how things rot.

7 Q How things what?

8 A Rot.

9 Q Okay. And how do you go about doing that research?

10 A Very carefully. So there's different levels that
11 we do this. We do controlled laboratory studies, where we
12 can control a lot of factors and look at a single factor
13 and how it regulates the decomposition process.

14 But we can expand that and we can do field-based
15 research as well where we put remains outdoors and watch
16 how they decompose.

17 Q And what are you specifically looking at as far as
18 the decomposition process?

19 A In most cases, I'm looking at how insects recycle
20 nutrients associated with an ephemeral resource, something
21 that is decomposing.

22 Q And you -- you said that you conduct research as a
23 lab. Is that at Texas A&M?

24 A It is.

1 Q Okay. Is there a name to this lab?

2 A It's the FLIES Facility.

3 Q And what is your role with the FLIES Facility?

4 A I'm the director of that facility.

5 Q Could you describe the FLIES Facility? Are there
6 other students who work at the facility?

7 A Yes.

8 THE COURT: Is it flies like a flying creature or
9 flies like the person?

10 THE WITNESS: Flies as like the insect.

11 THE COURT: Okay.

12 THE WITNESS: It's an acronym.

13 THE COURT: I couldn't think of that word. Thank you.
14 Flying creature.

15 THE WITNESS: It's been called worse.

16 THE COURT: I had a lot of other things go through my
17 mind. Thank you. The FLIES -- that's what it's called?
18 The FLIES Facility.

19 THE WITNESS: It's an acronym.

20 BY MR. SULTAN:

21 Q What's the acronym?

22 A Forensic laboratory for investigative
23 entomological sciences.

24 THE COURT: What do you know? All right. Thank you.

1 BY MR. SULTAN:

2 Q There's a reason for that.

3 A Yes.

4 Q And you said you're the director of that lab?

5 A I am.

6 Q And how -- what the size of this lab?

7 A Right now, there's 23 individuals working within
8 my lab.

9 Q And who are these individuals?

10 A So there's a hierarchy. At the top, of course,
11 there's myself at the director. Then I have three
12 post-docs that are PhDs that are working in the lab. And
13 then under them, there's seven PhD students that are
14 operating. And then four masters students and then the
15 rest are undergraduates. And I also have two technicians
16 in the lab.

17 Q And what is your relationship in the lab between
18 yourself and the -- those doc -- PhD students and the
19 undergraduate students?

20 A I tend to try to keep the lab focused on research
21 goals that we have, projects that we're trying to
22 complete, papers we're trying to write, degrees we're
23 trying to grant.

24 Q And are you supervising the work done at the lab?

1 A I oversee all of it, yes.

2 Q So everyone's working is under your supervision?

3 A Yes.

4 Q How is this lab funded?

5 A Predominantly through grants that we receive.

6 Q And where -- and what type of grants are these?

7 A So these are generally funded either through
8 federal grants, state grants, or industry.

9 Q Do you have federal grants?

10 A I do.

11 Q All right. And who are those grants with?

12 A Currently, we have two grants that are funded
13 through the National Institute of Justice. We have a
14 grant funded through the National Science Foundation. A
15 fourth grant that's funded through defense agencies --
16 defense -- Defense Advanced Research Program's Agency,
17 which is DARPA. And we also have some industry funded
18 grants right now.

19 Q At this -- currently about how much money have you
20 received from grants?

21 A Today, probably 5 million.

22 Q And how does one obtain these grants?

23 MS. DIGIACOMO: Objection. Relevance.

24 THE COURT: Overruled.

1 THE WITNESS: I have to write grant applications and
2 submit them to agencies and to be considered for funding.

3 BY MR. SULTAN:

4 Q Now, in the FLIES lab, have you conducted any
5 research relevant with forensic entomology?

6 A I have.

7 Q Now, have you published any papers in the field of
8 forensic entomology?

9 A I have.

10 Q About how many?

11 A I would say probably 30, 40 papers, somewhere in
12 that range.

13 Q And in what type of publications are these works
14 published in?

15 A Majority of them are refereed publications.

16 Q What's a refereed publication?

17 A It means I submit it to a journal for
18 consideration. It's reviewed by my peers and they decide
19 if it warrants publication or not.

20 Q Is that also known as peer-review?

21 A It is.

22 Q Do you have the names of the -- some of the
23 publications in which you have been published in?

24 A Some of the journals would be Forensic Science

1 International, Journal of Forensic Sciences, Medical
2 Entomology, Journal of Legal Medicine.

3 Q Now, you described what the -- I think you called it
4 refereed publications; right?

5 A Yes.

6 Q And that's also known as peer-review publication?

7 A Yes.

8 Q Now, you said that -- that you described as -- you
9 submit it and someone evaluates whether it's worthy of
10 publication; is that right?

11 A Yes.

12 Q Have you ever been on the evaluation side of the
13 peer-review process?

14 A Many times.

15 Q In what publications have you done the evaluation
16 for?

17 A Same journals as well as others ranging far
18 outside the forensic sciences.

19 Q And I want to take a step back and talk about your
20 education. Where did you do your undergraduate education?

21 A University of Georgia.

22 Q And your masters?

23 A Clemson University.

24 Q And your PhD?

1 A University of Georgia.

2 Q So very strong football schools?

3 A Pretty much.

4 Q And do you have any certifications in the field of
5 forensic entomology?

6 A I do. I'm board-certified by the American Board
7 of Forensic Entomology.

8 Q And when were you board-certified?

9 A 2006.

10 Q How did you get interested in the field of
11 entomology?

12 A I think it goes back to my roots, growing up on a
13 farm in South Georgia, just being surrounded by nature.

14 Q You described the work at Texas A&M Department of
15 Entomology. About how many departments of entomology are
16 there in the United States?

17 A I would estimate at around 30.

18 Q And you talked about your teaching or profession. I
19 want to talk about case work. Have you ever done any case
20 work in the field as applies to forensic entomology?

21 A Yes.

22 Q And is that as a consultant?

23 A Yes.

24 Q What types of cases have you consulted on?

1 A Death investigation, abuse, neglect, animal and
2 human -- or I should say nonhuman and human.

3 Q Are those all criminal cases?

4 A No. Some are civil.

5 Q Well, let me focus on the criminal cases. On which
6 side have you consulted with?

7 A Prosecution and defense.

8 Q When you work for the prosecution, were you
9 consulting with a medical examiner's office?

10 A In some instances.

11 Q Approximately how many cases have you consulted with,
12 both for the prosecution and defense?

13 A I think my number is over 114 at this time.

14 Q And what type of assistance are you able to provide
15 in these case consultations?

16 A Interpretation of information related to
17 entomology.

18 Q What does that mean?

19 A Basically, I'm assessing insect activity or lack
20 thereof associated with decomposing remains or with people
21 that are still alive.

22 Q And which states have you worked as a consultant in?

23 A Off the top of my head, Florida, Georgia, South
24 Carolina, North Carolina, Arkansas, Louisiana, Texas,

1 Montana, Nevada, Arizona.

2 Q And all this work at a consultant, you've applied
3 your knowledge of forensic entomology?

4 A I did.

5 THE COURT: I have a question. When you were a
6 consultant in Nevada, was it a criminal or civil case?

7 THE WITNESS: It was criminal.

8 THE COURT: And who were you retained by?

9 THE WITNESS: In that case, it was the defense.

10 THE COURT: Do you recall what case it was?

11 THE WITNESS: Not off the top of my head.

12 THE COURT: How long ago it was?

13 THE WITNESS: Three, four months ago in Reno.

14 THE COURT: Did you actually testify in court?

15 THE WITNESS: I did.

16 THE COURT: Okay. Thank you.

17 BY MR. SULTAN:

18 Q I now want to move to another part of your
19 background, your involvement with professional organizations,
20 if any. Are you a member of any professional organizations as
21 it relates to forensic entomology?

22 A Yes.

23 Q What are the names of those organizations?

24 A The European Association of Forensic Entomology,

1 North American Association of Forensic Entomology, the
2 American Academy of Forensic Sciences, and the
3 Entomological Society of America.

4 Q And what are the purpose of those organizations?

5 A They serve as a platform for advancing the
6 sciences.

7 Q And how do they advance the science -- sciences?

8 A Through publications. So they actually manage
9 journals. They also have an annual meeting where you get
10 the opportunity to present results and discuss those
11 results with your colleagues.

12 Q Now, in these organizations, have you ever held any
13 leadership positions in any of these professional
14 organizations?

15 A I have.

16 Q And which organizations have you held leadership
17 positions?

18 A So with the American Academy of Forensic
19 Sciences, I was the chair of the pathology section. With
20 the North American Forensic Entomology Association, I was
21 the president of that association. The American Board of
22 Forensic Entomology I was chair. That's some of the
23 offices I've held.

24 Q Have you ever worked in any government committees

1 involving your work in entomology?

2 A I have.

3 Q What's the name -- what, if any, committees have you
4 worked with?

5 A So I was on a subcommittee with the forensic
6 science -- off the top of my head -- the National
7 Committee on Forensic Sciences.

8 Q What was the purpose of that?

9 A We were evaluating science and the quality of
10 science that's used in forensic investigations.

11 Q And what was -- what was -- what was the purpose of
12 your subcommittee?

13 A So we were looking specifically -- we were
14 looking specifically at the science and the resulting
15 publications that are used in criminal or forensic
16 investigations. The commission as a whole was evaluating
17 forensic science.

18 Q And where was that commission located?

19 A It was held every -- every three months in
20 Washington, DC.

21 Q And how long have you been a member of that
22 committee?

23 A Two years.

24 Q Have you ever testified in court about your work as a

1 forensic entomologist?

2 A I have.

3 Q Have you ever been qualified as an expert in the
4 field of forensic entomology?

5 A Yes.

6 Q In which jurisdictions?

7 A Washington, DC, which I believe was a federal
8 case; Montana; Texas; Nevada.

9 MR. SULTAN: One moment, your Honor. Your Honor, at
10 this time, I believe this has already been premarked as
11 Defense H. May I show --

12 THE COURT: Any objections?

13 MS. DIGIACOMO: I'll submit it.

14 THE COURT: No objections to him showing --

15 MS. DIGIACOMO: I believe this is the CV; correct?

16 MR. SULTAN: This is the CV.

17 MS. DIGIACOMO: That's -- I'll submit it, your Honor.

18 THE COURT: Okay. Yeah, show it to him, please.

19 BY MR. SULTAN:

20 Q I'm showing you what's been premarked for
21 identification as Defense Exhibit H. Do you recognize that?

22 A Yes.

23 Q And what is that?

24 A It's my curriculum vitae.

1 Q Is it a fair and accurate copy of your curriculum
2 vitae?

3 A Yes.

4 MR. SULTAN: Your Honor, at this time I move Defense
5 Exhibit H into evidence.

6 THE COURT: Objections?

7 MS. DIGIACOMO: No. Submitted.

8 THE COURT: It's admitted.

9 [DEFENDANT'S EXHIBIT G ADMITTED.]

10 MR. SULTAN: Your Honor, I understand we're not in
11 front of the jury, so I just ask at this time
12 Dr. Tomberlin be -- tender him as an expert in the
13 forensic entomology.

14 THE COURT: All right. I think he's qualified as
15 such.

16 MR. SULTAN: Thank you, your Honor.

17 THE COURT: You can continue.

18 BY MR. SULTAN:

19 Q So you earlier described sort of -- well, let me go
20 back. What -- because this is sort of an earlier question.

21 What is entomology?

22 A It's the study of insects and their relatives.

23 Q And how long has entomology been an area of study?

24 A Dates back to biblical times in terms of

1 referencing insects and their importance.

2 Q So in what -- sort of taking this out of forensic
3 context. What sort of context can entomology be applied?

4 A So entomology is an extremely important part of
5 science due to the impact that insects and their relatives
6 have on society. Everything ranging from malaria and
7 mosquitoes to the crops that we plant in the field.
8 Insects are involved and their operation, their ecology.

9 Q So what kind of questions can entomology help answer?

10 A They can answer a lot of questions that are
11 directly related to us in terms of how do we prevent
12 malaria transmission or the transmission of the pathogen
13 to how do we predict cotton growing in a field.

14 But other research can be much broader and more
15 basic in terms of how life exists on this planet.

16 Q So you had described the FLIES lab that you run and
17 that some of the funding sources that you described, some
18 industry grants. So that's getting into the specifics of
19 which companies, but what kind of answers are they trying to
20 answer?

21 A They, for the most part, are looking for very
22 applied answers. They want to understand how to control
23 an insect. So we may look at different insecticides or
24 chemicals for controlling them or different behavioral

1 tactics. So what we would call cultural control, things
2 that we can do to modify the environment to prevent an
3 insect from being a pest.

4 Q Now, I want to now focus in on forensic entomology.
5 What is forensic entomology?

6 A It's the study of insects and their relatives in
7 their application within the forensic sciences.

8 Q Is that an application to criminal or civil cases?

9 A Yes.

10 Q Now, how long has forensic entomology been used?

11 A First case was documented in the 13th century.

12 Q And where was that?

13 A China.

14 Q I don't think we have pictures from that case.

15 A I don't think so.

16 Q How is forensic entomology used in civil and criminal
17 cases?

18 A In many cases, they're interested in
19 understanding why insects are associated with a person or
20 a pet or some other livestock that may be detrimental to
21 that person or be informative of what may have happened to
22 that individual.

23 Q So let's zero in on criminal cases. How is forensic
24 entomology used in criminal cases?

1 A So there are several different ways that
2 entomological evidence can be applied. One is obviously
3 determining how long someone has been dead by looking at
4 insect activity associated with the remains. Another is
5 to determine if a body had been moved from one location to
6 another. A third is actual DNA isolation from the crop or
7 the gut of the insect of determining who they were feeding
8 on. We could also look at entomotoxicology, which is, was
9 the individual on a narcotic at the time that the insect
10 was consuming them? These are a few examples.

11 Q So when you were talking about sort of -- sort of
12 assisting with time of death, that determination, just taking
13 a broader view -- because we'll get into more of the details
14 of this -- how is forensic entomology used to determine or
15 help determine or assist in determining time of death?

16 A So under appropriate conditions, insects are very
17 good at locating remains and colonizing them and recycling
18 those nutrients. So by understanding the development of
19 an insect, which is thermoregulated. In other words, if
20 it's hot, insect develops real fast. If it's cold, the
21 insect develops real slow.

22 We can determine the age of the insect and work
23 backwards and determine when colonization occurred, which
24 would be in many cases a minimum time of death.

1 Q So you get to a scene. There is a remain. You
2 get -- you capture or you locate an insect. You see what
3 stage they're in and you work backwards as to how long it took
4 them to get to that stage?

5 A Yes.

6 Q Okay. And which insects are normally looked at when
7 making these determinations?

8 A The primary arthropods that we're focusing in on
9 are blowflies.

10 Q And what are blowflies?

11 A They're a metallic -- usually metallic green or
12 blue fly that's active during the warm times of the year.
13 They are primary consumers of carrion or decomposing
14 remains.

15 Q When you say carrion, what are you talking about?

16 A Decomposing remains, vertebrate remains.

17 Q So carrion could be a dead body?

18 A Could be a dead body, yes.

19 Q And where are blowflies found?

20 A Throughout the world, excluding maybe Antarctica.

21 Q And how do you know that?

22 A Just through my training and understanding of the
23 distribution of these species.

24 Q Have there been studies about that?

1 A Yes.

2 Q And what is the primary purpose of a blowfly?

3 A I think it depends on who you talk to. I would
4 say that their primary purpose is for recycling these
5 resources in the given environment. Some people may say
6 could be a nuisance.

7 Q And when you say recycling resources, what are the
8 resources they're recycling?

9 A Decomposing vertebrate remains.

10 Q And could be dead bodies?

11 A Yes.

12 Q What is it about dead bodies, carrion, decomposed
13 remains -- the terms you use -- that blowflies are attracted
14 to?

15 A Predominantly, it's volatiles associated with the
16 body. So as it begins -- as soon as a person dies, they
17 begin to emit odors that attract the insect to the body.

18 Q And the insect would be the blowfly?

19 A Yeah, yes.

20 Q And what's the time frame that a blowfly is attracted
21 to a decomposing body, dead body, a carrion?

22 A Under appropriate conditions, within minutes.

23 Q So let me -- I'll get into the appropriate
24 conditions. How do you know that?

1 A Through my own research and understanding of the
2 literature of the field, what's been published.

3 Q And what's the literature in the field about? The
4 speed with which blowflies go to decomposing bodies, dead
5 bodies?

6 A Right. So there has been a lot of studies of
7 understanding what's called insect succession. So this is
8 looking at how the community changes over time. So there
9 have been many studies throughout the world where they
10 take remains and they put them out. And they catalog what
11 insects are coming in and colonizing.

12 So they look at when do they arrive and what do
13 they do once they get there.

14 Q And have you done any review of the literature on the
15 succession study?

16 A I have.

17 Q And what was that review?

18 A So I looked at 75 studies that examined insect
19 succession. And I looked at when did they determine when
20 insects were attracted to colonize. And the majority of
21 the studies showed that insects were attracted within
22 hours to bodies and colonize them.

23 Q And what is the distance that a blowfly travels to a
24 decomposed body?

1 A So that -- the literature on blowfly movement is
2 extensive. There is a lot of work showing blowflies can
3 travel miles, kilometers -- I don't know if you're metric
4 or not -- long distances to locate resources. There has
5 been a lot of studies from the '60s and '70s that examine
6 this.

7 So it wouldn't be unusual for a fly to be able to
8 travel a kilometer to locate a resource.

9 Q Do any other insects get to a decomposed body, a dead
10 body, before a blowfly?

11 A There can be others that can come in contact with
12 remains before the blowfly gets there, sure.

13 Q Now, you said optimal conditions for blowfly
14 activity. What are those optimal conditions?

15 A Depends on location. So those conditions are
16 going to vary. So we'd probably want to say within a
17 given site. I'll start with Texas, for example.

18 Ideal conditions would be temperatures above 55
19 degrees Fahrenheit; no winds or low winds, less than ten
20 miles per hour; not raining. Those would be considered
21 ideal. Sunlight.

22 Q What role does heat play on blowfly activity?

23 A So if the temperature drops below 55 degrees
24 Fahrenheit, typically the insect becomes inactive because

1 it is an ectotherm. It depends on external heat sources
2 to remain warm. If it gets cool, the fly with stop
3 moving.

4 So that's the importance of temperature.

5 Q So that's at the low end; right?

6 A Yes.

7 Q What if the temperature goes up?

8 A Sure. So if the temperature is too extreme, too
9 high, the insect will also seek locations to avoid the
10 heat so it can conserve water.

11 Q Is there a temperature range that's ideal or that you
12 would see high blowfly activity?

13 A Sure. Typically, if the temperature is above 70
14 degrees Fahrenheit and below 95, 100 degrees Fahrenheit,
15 you'll see a fair amount of activity.

16 Q Are those optimal conditions for blowfly activity?

17 A That's when you typically see them active, yes.

18 THE COURT: 75 to 95?

19 THE WITNESS: Yes, ma'am.

20 BY MR. SULTAN:

21 Q What about sort of the covering of a body? What
22 impact would that have on blowfly activity?

23 A I think you have to define what you mean by
24 cover. If you're saying that the body is under some

1 vegetation or has something laying on it loosely, not much
2 a problem. If you bury a body, it may delay colonization
3 for some amount of time, but insects are extremely good at
4 finding remains. There is actually one that is defined as
5 the coffin fly because it can burrow six feet into the
6 ground, get through the vault, through the casket to the
7 remains. So insects are very good at locating these
8 resources.

9 Q What sort of -- so we talked about the temperature
10 outside. What about the time of the day? What impact, if
11 any, does that have on insect -- blowfly activity?

12 A So insects are diurnal. They are active during
13 daytime. So if it's dark, they're typically not active.

14 Q Is that based on like -- well, withdraw that.
15 What about the condition of the actual carrion or
16 dead body? What, if any, impact the condition of the body
17 would have on blowfly activity?

18 A From a forensic perspective, if there's blood
19 present, that's going to serve as an additional signal.
20 That's going to attract flies.

21 Q Why is that?

22 A Because it's also serving -- indicating resources
23 present.

24 Q So in addition to blood, are there any parts of the

1 body that blowflies are attracted to?

2 A Typically, they're attracted to the natural
3 orifices of the body, so the nose, mouth, ears, urogenital
4 area. In some cases, if there's wounds inflicted on the
5 body, they will be attracted there as well.

6 Q Why is that?

7 A Because it's a place where they can lay their
8 eggs.

9 Q So you described as now about -- these are places
10 where blowflies lay eggs; is that right?

11 A Yes.

12 Q What do blowfly eggs look like?

13 A They look like sawdust.

14 Q Like sorry?

15 A Like sawdust, miniature grains of rice, usually
16 in clumps, creamy yellow color.

17 Q And how many eggs do blowflies lay at a time?

18 A Usually several hundred.

19 Q And how do they look when they're --

20 A Usually smaller than a dime in diameter, and it
21 looks like white sawdust that's clumped together.

22 Q So it's clumped -- it's --

23 A Yes.

24 Q How long after an insect gets to a carrion or dead

1 body would they lay eggs?

2 A It could be within minutes to hours.

3 Q And how long would it take for an egg to develop and
4 hatch?

5 A During the summertime, less than 12 hours.

6 Q And what happens after an egg hatches?

7 A So you have the -- what's referred to as a first
8 instar, so that's the first larval stage. And this
9 insect, this maggot, will actively feed on the remains.

10 Q So when -- when a blowfly egg hatches, a maggot is
11 what comes out?

12 A Yes.

13 Q So given that we've gone through this sort of -- sort
14 of life cycle of the blowfly, I think, how then would you
15 apply this life cycle to assisting in a time of death
16 investigation?

17 A So again, if you can think of the life cycle as a
18 clock, the face of a clock, noon is the adult; 3:00
19 o'clock is the egg; 6:00 o'clock is the larva; 9:00
20 o'clock is the pupil.

21 So the rate at which the arms of the clock are
22 spinning around from adult back to adult is dependent on
23 temperature. So if it's hot, it goes real fast. If it's
24 cold, it goes real slow.

1 Q And is that in the temperature range that you
2 described --

3 A Yes.

4 Q -- as the optimal time?

5 I want to talk about your work on this case. When
6 did you get involved with this case, Ms. Lobato's case?

7 A I believe it was February of this year.

8 Q And how did you get involved in this case?

9 A Initially through E-mail correspondence and then
10 through a -- a meeting in person at the American Academy
11 of Forensic Sciences.

12 Q And -- and who did you contact -- or who contacted
13 you?

14 A I believe lead counsel in this case.

15 Q And that would be Ms. Potkin of the Innocence
16 Project?

17 A Yes.

18 Q And what were you asked to do?

19 A To assess the entomological evidence associated
20 with this case and render an opinion.

21 Q Now, you know that Ms. Potkin and myself, we work for
22 the Innocence Project in New York?

23 A Yes.

24 Q Have you ever worked with the Innocence Project of

1 New York before?

2 A I have not.

3 Q Have you ever worked with any Innocence Project
4 before?

5 A The only other Innocence Project case was out
6 of -- I believe it was out of Arkansas or Missouri. It
7 might have been Missouri.

8 Q And what did you -- who was your role in that case?

9 A They just asked if I would review a case report
10 associated with a case of interest.

11 Q Now, are you being compensated for your testimony
12 today?

13 A Nothing beyond my normal hours at Texas A&M
14 because I had to take time off without pay to be here.

15 Q So you're being compensated for the time you're here
16 based on what your salary is --

17 A Yes.

18 Q -- at Texas A&M?

19 And prior to Ms. Potkin reaching out to you, what did
20 you know about this case?

21 A Nothing.

22 Q Did you know any of the -- any of the conclusions of
23 the other entomologists involved with this case?

24 A I did not.

1 Q And what information were you provided to review?

2 A I was provided photographic evidence as well as,
3 I believe, autopsy report and crime scene investigation
4 report.

5 Q Did you review the weather data from that day?

6 A I did.

7 Q And what were the photographs? What did the
8 photographs depict?

9 A They ranged from the body recovery site through
10 autopsy.

11 Q And just so we're clear, you received -- did you also
12 receive high resolution photograph -- of these same
13 photographs?

14 A I did.

15 Q Now, do you know Dr. Andrew Baker?

16 A I do.

17 Q Did you know anything about his analysis prior to
18 you -- prior to your analysis in this case?

19 A I did not.

20 Q Prior to your development with this case, did you
21 speak to him about this case?

22 A No.

23 Q Now, you discussed your -- your scholarship earlier,
24 your areas of research. Have you ever conducted any research

1 in blowfly activity in Las Vegas?

2 A I have not.

3 Q Have you ever conducted any studies of blowfly
4 activity in, I guess, comparable temperate areas?

5 A I have.

6 Q And what areas -- area was that?

7 A Well, it was Texas.

8 Q Have you ever done any blowfly activity studies in
9 the Southwest? Have you -- have you ever studied blowfly
10 activity in the Southwest United States?

11 A I have not, but there's an ample amount of
12 research on blowfly activity in the southwestern US.

13 Q Okay. And what were those geographic areas?

14 A So previous studies that have been done in
15 south -- Southern California and New Mexico, Arizona.

16 Q And how do those, in terms of temperature geography,
17 relate to Las Vegas?

18 A They could be comparable.

19 Q Now, do you know if blowflies exist in Las Vegas?

20 A Yes.

21 Q And how do you know that?

22 A Having dinner outside and having blowflies trying
23 to land on my food.

24 Q So you have some personal experience?

1 A Personal experience.

2 Q And now, you've said you reviewed the Southwest --
3 studies involving the Southwest United States?

4 A Yes.

5 Q What is your opinion about those studies?

6 A That the general characteristics of decomposition
7 in terms of insect activity are similar in these regions
8 to others around the world.

9 Q And comparable to your own research that you yourself
10 conducted?

11 A Yes.

12 Q And you said that was in Texas?

13 A Yes.

14 Q And you listed that the materials that you had
15 reviewed as part of your analysis in this case -- the
16 photographs, the autopsy report, the coroner report, the
17 temperature data -- are those -- are those materials you
18 normally review when you analyze a case?

19 A Yes.

20 Q Have you ever been asked to review a photograph to
21 sort of identify the existence of blowfly eggs or look for
22 blowfly activity on a picture?

23 A Yes.

24 Q So in your experience, if there is a -- a blowfly

1 egg, it would be depicted in a picture?

2 A Yes.

3 Q Is it your experience in the -- I think you said it
4 was 114 cases that you consulted on that the existence of
5 blowfly eggs are documented in coroner autopsy reports?

6 A Yes.

7 Q So now, talking about -- you know, we talked -- you
8 spoke -- you mentioned appropriate conditions for blowfly
9 activities. I want to talk about applying that to July 8th,
10 2001, the date in question. Okay?

11 A Yes.

12 Q Can you walk us through the -- sort of the conditions
13 that existed on that day and whether or not they would be
14 comparable -- they would be (inaudible) to blowfly activity?

15 A It was a sunny day, and the temperatures were
16 warm to hot throughout the day. Winds were low, no rain.
17 The conditions seemed to be very appropriate for fly
18 activity.

19 Q So let's focus on -- do you recall what the
20 temperatures were on that day?

21 A From what I recall, highs around 95, lows in the
22 70s.

23 Q Would looking at the -- do you need -- do you
24 remember that or would you want to look at the --

1 A I'd like to see it. I mean, that's off -- that's
2 going from memory.

3 MS. DIGIACOMO: That's Exhibit E. The weather is
4 Exhibit E.

5 MS. POTKIN: Here you go.

6 MR. SULTAN: Okay.

7 MS. DIGIACOMO: Well, I'd ask you show the exhibits,
8 not just copies.

9 MR. SULTAN: Oh. Your Honor, may I approach?

10 THE COURT: Yes.

11 BY MR. SULTAN:

12 Q Showing you what's been premarked -- showing you
13 what's been premarked -- what's been introduced into evidence
14 as Defense Exhibit E, could you look at that and look up when
15 you're -- when your memory is refreshed as to the temperature
16 on that day?

17 A Uh-huh, yes.

18 Q Is your memory refreshed?

19 A It was a little cooler, 73.9 and as high as 95
20 degrees.

21 Q And how -- and how long was the temperature in the
22 90s?

23 A It appears to be been in the 90s from right at
24 noon until around 9:00 p.m.

1 Q And that temperature, how does that relate to ideal
2 conditions for blowfly activity?

3 A Blowflies can still be active in that
4 temperature, even with -- what's interesting here is the
5 heat index is listed, because it indicates that it was
6 actually cooler with heat index. So I would say flies
7 would be expected to be active.

8 Q At that time?

9 A Uh-huh, yes.

10 Q Now, you had stated you reviewed some of the autopsy
11 photos; is that right?

12 A Yes.

13 Q And some of the crime scene photos?

14 A Yes.

15 MR. SULTAN: Court's indulgence, your Honor.

16 BY MR. SULTAN:

17 Q Let me ask you this: You stated that the temperature
18 was in the 90s for most -- from noon to about 8:00, I think it
19 was; right?

20 A Yes.

21 Q Would the fact that it was cloudy prevent blowflies
22 from being active at that time?

23 A Not under those conditions.

24 Q So is it fair to say that the temperature at 90

1 degrees would be optimal whether or not the sun is out, fully
2 out?

3 A Yes.

4 Q Now, you had -- you had said that you -- you saw the
5 autopsy -- the crime scene photographs; right?

6 A Yes.

7 Q And you noticed -- you'd agree that the body had some
8 covering on it; right?

9 A Yes.

10 Q Showing you what's been --

11 MS. DIGIACOMO: You need to use the exhibits
12 (inaudible) to keep the record.

13 I'm sorry, your Honor. I'm just asking them that
14 they use the exhibits that are marked so we can make a
15 record versus their own copies.

16 THE COURT: Okay.

17 THE WITNESS: Thank you so much.

18 MR. SULTAN: And I'm going to show the ELMO.

19 THE COURT: Okay.

20 BY MR. SULTAN:

21 Q Showing what's been introduced into evidence as
22 Defense F-8. Now, Doctor, do you recognize this picture?

23 A Yes.

24 Q Okay. And what is that?

1 A It's the body recovery site.

2 Q And did you review this picture as part of your
3 analysis in this case?

4 A Yes.

5 Q Okay. Now, you can see that there's some covering on
6 Mr. Bailey's body; correct?

7 A Yes.

8 Q What, if any, impact would that covering have on
9 blowfly activity?

10 A I would say it would have no impact. It could
11 actually enhance blowfly activity.

12 Q Well, why do you say that?

13 A Well, during the hotter time of the day, it
14 provides shelter for the flies. They would aggregate
15 underneath on the remains, not being disturbed. It would
16 be a safe haven for them.

17 Q Well, how would -- if there's some boxes and papers
18 on top of the body, how would flies locate that body?

19 A They're extremely efficient at locating these
20 resources. Their livelihood depends on it, so they're
21 able to follow the scent to the remains. So they would
22 land on the cardboard or fly under the cardboard and crawl
23 to the body.

24 Q And how -- how do you know that the covering wouldn't

1 prevent that scent from emanating?

2 A Previous research has been done, publications,
3 understanding the biology of these insects and how they
4 operate.

5 Q So there have been studies about some covering and
6 how that does not prevent blowfly activity?

7 A It depends on the -- the level of covering that
8 you're referring to. So in a case such as this, I
9 would -- I would conclude that it would have no impact.

10 Q Now, you reviewed the condition of Mr. Bailey's body
11 itself; right?

12 A Yes.

13 Q And you described that there are certain parts of the
14 body that -- certain orifices, I think you said, that are --
15 that that -- blowflies are attracted to; right?

16 A Yes.

17 Q And those were the -- what were they?

18 A So the natural orifices of the body such as the
19 nose, mouth, ears, urogenital area or wounds that are
20 inflicted on the body.

21 MR. SULTAN: I'm going to show him --

22 Court's indulgence, your Honor.

23 I'm going to show him (inaudible).

24 BY MR. SULTAN:

1 Q I'm showing you what's already been introduced into
2 evidence as Defense Exhibit F-1. Do you recognize this
3 picture?

4 A I do.

5 Q And what is that?

6 A It's of a facial shot of the decedent.

7 Q Okay. And what is it showing?

8 A It's showing an examination of the eye and a
9 gross observation of the face.

10 Q Is this an area of the body that you would expect to
11 see blowfly activity?

12 A Yes.

13 Q Do you see any blowfly -- any evidence of blowfly
14 activity on this body?

15 A No.

16 Q Do you see any eggs on -- blowfly eggs in this
17 picture?

18 A None.

19 Q I'm showing you what's been introduced as F-2. Do
20 you recognize this picture?

21 A Yes.

22 Q And what is that?

23 A It's the oral area and the nasal area of the
24 decedent.

1 Q And is that an area where -- where you'd expect
2 blowfly activity?

3 A Yes.

4 Q Do you see any evidence of any blowfly activity in
5 this picture?

6 A No.

7 Q Okay. Do you see any blowfly eggs in this picture?

8 A No.

9 Q Showing you what's been introduced in evidence as
10 Defendant's F-6. Do you recognize this picture?

11 A Yes.

12 Q And what is this picture of?

13 A Another head shot of the decedent.

14 Q Okay. Is there anything in this picture that you
15 would say -- well, let me ask this: Is this body in a
16 condition that would be attractive for blowflies?

17 A Extremely attractive.

18 Q What about it would make it attractive to blowflies?

19 A Other than the individual being dead, all of the
20 blood that's present and the wounds that are on the body.

21 Q Okay. Even if there was something over it?

22 A Yes. In the condition of this particular case
23 where the material is loose, shouldn't be a problem at
24 all.

1 Q Do you see any evidence -- do you see any blowfly
2 eggs on this picture?

3 A I do not.

4 Q Do you see any evidence of blowfly activity on this
5 picture?

6 A None.

7 Q In any of the pictures that you had reviewed as part
8 of your analysis in this case, did you see any blowfly eggs,
9 any pictures of any blowfly eggs on Mr. Bailey's body?

10 A I did not.

11 Q You also reviewed, you said, the coroner's report and
12 the autopsy report; is that right?

13 A Yes.

14 Q Did you see any mention in those reports of any
15 blowfly eggs on Mr. Bailey's body?

16 A I saw no reference to blowflies in general in
17 association with the remains.

18 Q Now, if there was any blowfly activity on
19 Mr. Bailey's body, would you expect to see that noted in an
20 autopsy or coroner's report?

21 A Yes.

22 MR. SULTAN: Court's indulgence.

23 BY MR. SULTAN:

24 Q Let me just refer back to one of the pictures.

1 MR. SULTAN: The Court's indulgence.

2 BY MR. SULTAN:

3 Q I showed you this picture. It's F-6.

4 Now, his eyes appear to be closed; is that right?

5 A Yes.

6 Q Would that have any impact on the lack of blowfly
7 eggs being laid in that area?

8 A Not the lack of, but maybe the lack of observing
9 it.

10 Q Okay. Are you saying that it could be inside?

11 A Sure. But that's what's nice about the photos
12 where they pull the eyelids back and you can actually look
13 and see if there is activity. Same with the oral cavity
14 of pulling the lips down so you can see where you would
15 expect colonization to have occurred, you can see that
16 there's none there.

17 Q So under the -- under the conditions you understand
18 about Mr. Bailey's death, the facts of this case, you know,
19 your review of the materials, what's the significance of the
20 lack of blowfly activity?

21 A That the individual hadn't been dead very long.

22 Q So based on your expertise and forensic entomology,
23 your review of the pictures, the reports, the lack -- the
24 forensic evidence, entomological evidence, and the lack of

1 evidence, do you have a conclusion -- were you able to draw a
2 conclusion about when Mr. Bailey died?

3 A Sure. So based on everything that you listed and
4 the 20 years of experience -- 20-plus years of experience
5 working in the field is that this individual hasn't been
6 dead very long, most likely not until after dark.

7 Q And is that to a reasonable degree of scientific
8 probability?

9 A Yes.

10 Q If Mr. Bailey's body had been -- if Mr. Bailey had
11 been killed in the morning of July 8th, had remained in that
12 location under those conditions for the entire day and it had
13 been -- his body had been discovered at 10:30 at night, what
14 would you expect his body to look like, given your expertise
15 in the field of forensic entomology?

16 A If you say in the morning, and I would assume you
17 were discussing early in the morning --

18 Q 4:00 a.m.

19 A 4:00 a.m., then you're talking about a set of
20 remains sitting under ideal conditions, starting to
21 decompose and release volatile, so you're looking at a
22 odor plume that's developing in that area. So you're
23 building up this material that's necessary to bring flies
24 in.

1 So when sunlight happens, when the sun rises, the
2 insects that detect that come in and colonize the remains.
3 I would expect to have seen -- if not just eggs, I would
4 have expected to have seen maggot activity on the remains.

5 MR. SULTAN: I have nothing further, your Honor.

6 THE COURT: Can we just take five minutes before you
7 start?

8 MS. DIGIACOMO: That -- I'd appreciate a bathroom
9 break myself.

10 THE COURT: All right. Let's come back in five.

11 [RECESS AT 02:55 P.M.; PROCEEDINGS RESUMED AT
12 03:05 P.M.]

13 THE CLERK: We're on the record.

14 THE COURT: All right. Ms. DiGiacomo, if you want to
15 do your cross.

16 MS. DIGIACOMO: Thank you.

17
18 CROSS-EXAMINATION

19 BY MS. DIGIACOMO:

20 Q All right. Good afternoon. Now, your opinion, if I
21 have it correctly, is that Mr. Bailey, because of the lack of
22 blowfly eggs or activity, most likely was killed after dark or
23 short in time from when he was found; is that correct?

24 A Yes.

1 Q And you say most likely because you can't say for
2 certain; correct?

3 A Correct.

4 Q Normally, is it fair to say in entomology you are
5 dealing with bodies -- when you're doing time of death or PMI,
6 you're dealing with bodies that have some sort of insect
7 activity on that you can evaluate, put under the microscope,
8 and work your way back; correct?

9 A I would say that would be considered a
10 traditional path, yes.

11 Q Traditional. How often do you do such PMIs or times
12 of death on negative evidence?

13 A So I have worked on cases that are based on
14 photographic evidence where I have no actual specimens to
15 look under the microscope. I've had cases where there's
16 been no insect activity, and that's the particular
17 question at hand is why is there not activity in terms of
18 suspected time of death.

19 Q Okay. But the -- the normal way would be to take
20 what bug activity is on there to determine what they are so
21 that you can work your way back to when they began?

22 A I think that's a common question that's asked of
23 an entomologist. I think in most cases where insect
24 evidence is observed, the question is how long has that

1 evidence been associated with the remains.

2 I think the counterquestion of cases where insect
3 evidence is not present is just as important but often is
4 not asked of entomologists.

5 Q Okay. So it's just as important?

6 A I think so.

7 Q And you had mentioned before that location is a huge
8 factor in making these determinations?

9 A What do you mean by location?

10 Q Well, when defense counsel was asking the optimal
11 conditions or ideal conditions for insect activity regarding
12 carrion, you said it depends on the location?

13 A Yes.

14 Q Okay. So it's fair to say in one region how
15 blowflies or insect activity may be may not correlate to
16 another region?

17 A I believe it's -- in general, it's accepted that
18 if you have optimal conditions and blowflies are present
19 that they're going to respond a given way.

20 Q And that's generalities?

21 A Yes.

22 Q That is not anything specific to Las Vegas or this
23 desert that we live in?

24 A No, ma'am.

1 Q Okay. In fact, you yourself have never done any
2 studies here in Las Vegas?

3 A Correct.

4 Q And have you even ever looked at any other dead
5 bodies here in Las Vegas?

6 A I hope not.

7 Q Okay. But I mean, you haven't been asked to view
8 photographs like you were in this case?

9 A Not in Las Vegas, no, ma'am.

10 Q All right.

11 THE COURT: May I ask a question, please?

12 Doctor, when you say optimal conditions, is
13 that -- does optimal conditions -- does that reference
14 temperatures or does terrain make a difference? For
15 example, you know, whether it's in the desert or whether
16 it's in east Texas where it's pine trees.

17 THE WITNESS: Yes. It -- all of those conditions play
18 a role. So when I assessed information on this case,
19 we're talking about urban environment. Blowflies are
20 synanthropic. They like people, so you expect to see a
21 population here established.

22 There is garbage associated with the scene.
23 There is trash. There is other things such as the remains
24 and blood. This is all factors that will drive blowfly

1 behavior.

2 And then on top of that, you look at abiotic
3 factors like temperature, rainfall, wind, terrain is
4 important. Is it in the basement? Is it outdoors? All
5 of those factors play a role.

6 So when I say optimal, it's a general term. So
7 there can be a window. So it's not like it has to be 87
8 degrees Fahrenheit. It can be between 55 degrees
9 Fahrenheit and 110 degrees Fahrenheit and you would expect
10 there to be activity.

11 THE COURT: Okay. Are there certain places where
12 you'd expect to find more flies versus less, such as a
13 place that had decomposing organic substances such as
14 food?

15 THE WITNESS: Yes. So if I were to look at, say, a
16 hospital versus a Dumpster, I would expect there to be
17 more fly activity at the Dumpster.

18 THE COURT: Okay. Thank you.

19 BY MS. DIGIACOMO:

20 Q When you have a -- a corpse, daylight hours, and you
21 would expect if they expired in daylight hours or shortly
22 before daylight hours, there would be blowfly activity within
23 minutes to hours, you said?

24 A Yes.

1 Q Okay. So when people that are alive are present in
2 that area as well, will that, I guess, keep the blowflies from
3 doing what they want to do to the carrion?

4 A I think it's -- I'll say it's analogous to
5 whether you sit down to have dinner, you're present, your
6 food's present, but flies still come in and land on it.
7 So regardless of whether you're there or not, insects are
8 pretty aggressive in terms of trying to get resources. So
9 you'd expect there to be activity.

10 The less disturbance of the resource, the more
11 activity you expect. So, for example, on your food, if
12 you don't disturb it, then more things could happen, such
13 as more flies would be attracted to the site versus you
14 chewing -- shooing them away.

15 Q Okay. Thank you. All right.

16 Now, is it fair to say with entomologists that when
17 you're looking to determine a PMI that there's two ways to do
18 it: developmental or succession?

19 A To determine time of colonization --

20 Q Yeah.

21 A Yes.

22 Q Okay. And when you're looking at a case like this,
23 because there's the lack of activity, this would be considered
24 more the succession method of looking at it?

1 THE COURT: Okay. I need a little foundation because
2 I -- you obviously know more about colonization than I do.

3 MS. DIGIACOMO: Okay. I'm sorry. I'll back up.

4 THE WITNESS: Sure.

5 THE COURT: Okay.

6 BY MS. DIGIACOMO:

7 Q All right. When a forensic entomologist is looking
8 at a case or a corpse and trying to determine the PMI, what
9 two methods are normally used?

10 A So the first method that the attorney brought
11 up -- I'm sorry -- that the attorney brought up was
12 development time. So that's the idea of the clock that I
13 mentioned. If it's real hot, the clock goes fast. If
14 it's cold, it goes slow. So that's development time.

15 And then the other idea of succession is change
16 in the community over time. So for example, if you have a
17 set of remains out, when they're fresh, you expect players
18 A, B, and C to be present versus if we're in the skeletal
19 stage, we expect X, Y, and Z to be present. So that
20 change in the community over time can be used to infer how
21 long insects have been on the remains.

22 THE COURT: So different bugs like different stages of
23 decomposition?

24 THE WITNESS: Exactly. So if you were dealing with

1 the bloat stage or active decay, you would expect
2 different insects to be present at that time.

3 BY MS. DIGIACOMO:

4 Q And if I could just explain it briefly. So, you
5 know, when you have the blowfly stage, they like the, I guess
6 it would be, the bloody, meaty flesh, internal organs?

7 A They will start, obviously, in the facial region
8 and the urogenital, and they work towards the center, then
9 out the extremities.

10 Q They don't eat the skin?

11 A No, typically not.

12 Q Okay. Once they have finished their part, what would
13 be the next step, I guess, in succession of insects?

14 A So once the flies have removed the soft tissue,
15 you would expect to see more beetle activity that would
16 focus on the skin, cartilage, and other dry material
17 that's present.

18 Q All right. And is there any other group that comes
19 after the beetles?

20 A So if you're dealing with a soil substrate, then
21 you can have -- underneath the body, you could have mite
22 or columba (phonetic) activity. These are ocapods
23 (phonetic) in the soil. On the remains, typically
24 beetles. You could have some mite activity associated

1 with it. But that's generally the players that you expect
2 to see.

3 Q Okay. So now going back to when you're -- when
4 you're looking at a case, if you're going to use the
5 developmental method, is that where you would normally have,
6 like, maggots or larva or something that you can look at to
7 figure out what they are to go back in time?

8 A So that's the standard method, yes.

9 Q Okay. So when we're talking about, I guess, what
10 we're talking about here today, then the negative blowfly
11 activity, the lack of colonization, that's really looking at
12 the succession method?

13 A It applies to both. Because even in succession,
14 you have to have the initial players come in. And that's
15 generally the flies. So succession and development
16 typically start with the same thing. But development can
17 be applied to a fly, a beetle, any --

18 Q Right. But isn't it normally with development you
19 have some sort of specimen to be able to test to go back?

20 A You would need the same thing with the succession
21 method as well. You'd have to have samples of all the
22 arthropods present to say, here's what the community is.
23 What could you expect -- or what does that tell you about
24 how long a person has been dead.

1 Q Okay. And -- now, you said with regard to blowflies,
2 they're the first actors that normally come to a carrion; is
3 that correct?

4 A Typically, yes.

5 Q Typically. What else could be first?

6 A Well, it depends on the environment. So you
7 could have remains there and have beetles possibly come in
8 and begin feeding on the body. But in terms of
9 decomposition ecology, in terms of invertebrates,
10 blowflies are the primary player. They're the ones that
11 come in and move the soft tissue.

12 Q All right. What is the difference between a blowfly
13 and a flesh fly?

14 A So a flesh fly is another family of flies. So
15 Calliphoridae is the blowfly. Sarcophagidae is the flesh
16 fly.

17 What's the key difference between the two is that
18 blowflies will lay eggs in general. There are some
19 species in Hawaii, only in Hawaii, that lay larvae. But
20 that's in Hawaii.

21 Q Okay. So let's not confuse us.

22 A Sure. So flesh flies lay larvae.

23 Q Right.

24 A They skip the egg.

1 Q Are flesh flies also sometimes the first to a
2 carrion?

3 A Yes.

4 Q Okay. So could be flesh flies or blow flesh --
5 blowflies --

6 A Right.

7 Q -- not flesh. Sorry.

8 A It's okay. Yeah. Blowflies, you'd expect to see
9 egg activity. And if it's been there long enough, they'll
10 hatch into larvae. If it's flesh flies, you expect them
11 to come in and lay live larvae.

12 Q All right. And it could be -- either one of those
13 could be first, or could they both come at the same time?

14 A They could, yes.

15 Q All right. Okay. Now, with -- regardless of
16 developmental or succession method, the geographic region is
17 very important?

18 A It is.

19 Q Okay. Now, you said you've never done any studies of
20 bodies or -- yourself in Las Vegas. And you said you've never
21 read any studies done in Las Vegas; correct?

22 A I'm -- not off the top of my head, I'm not
23 familiar with a study done in Las Vegas.

24 Q Okay. But you said you have studied other regions

1 that you feel are comparable?

2 A Yes.

3 Q And that was southern -- Southern California?

4 A Southwest.

5 Q The -- okay.

6 A And it's not necessarily studies that I have
7 done. It's studies that I have read. So the players in
8 these regions are the same, so the same blowfly species,
9 maybe some different species. But in general, blowflies
10 are the primary ones that come in and colonize first,
11 followed by beetles. The succession that you talked about
12 takes place.

13 Q Okay. So but -- so again, we're just talking in
14 generalities that these areas are comparable?

15 A Yes.

16 Q You don't know what the actual blowfly population is
17 in Las Vegas, do you?

18 A Not beyond what I've seen come to my plate in Las
19 Vegas.

20 Q Do you -- what have you seen come to your plate?

21 A So I've seen *Lucilia*, which is a genus of
22 blowfly, which is common throughout the world.

23 Q Oh, you're talking about when you were eating?

24 A Yeah.

1 Q Okay. I'm not saying we don't have blowflies here,
2 because you said they're all over the world; correct?

3 A Yes.

4 Q I'm just saying you don't know what our population is
5 here?

6 A Oh, I see what you're saying. I do not know your
7 numbers.

8 Q Okay. And you don't know our numbers of flesh flies
9 either?

10 A Flesh flies, no.

11 Q Okay. Are you familiar with Dr. Neil Haskell?

12 A Yes.

13 Q Okay. And he's been in the forensic entomology field
14 for --

15 A My lifetime.

16 Q Your lifetime, yes. Long before you got into it?

17 A Most likely, yes.

18 Q And are you familiar with Spitz and Fisher's treatise
19 on -- for -- that forensic pathologists use?

20 A I have not looked at it, no.

21 Q Okay. But if Dr. Haskell was the one that wrote the
22 section regarding forensic entomology for that treatise, that
23 wouldn't surprise you?

24 A No.

1 Q Because he's been around for a long time?

2 A Yes.

3 Q Now, are you familiar with the fact that Dr. Haskell
4 has actually worked cases in the Las Vegas area?

5 A Yes.

6 Q Okay. Had -- did you consult with him at all before
7 forming your opinion in this case?

8 A I did not.

9 Q Okay. Would it surprise you that in the Las Vegas
10 area, blowflies do not always come to a dead body that's been
11 outside?

12 MR. SULTAN: Objection, your Honor. The source of
13 this is hearsay. What is this?

14 MS. DIGIACOMO: He's an expert. I can pose him
15 hypotheticals, and this is cross-examination. I can test
16 his knowledge.

17 MR. SULTAN: Okay. The question wasn't posed as a
18 hypothetical. It was, "Would you be surprised?" So it
19 sounds like she's stating a fact.

20 THE COURT: Are you --

21 MS. DIGIACOMO: I'm just challenging his knowledge of
22 our area.

23 THE COURT: With what, though?

24 MS. DIGIACOMO: With information from Dr. Haskell,

1 which he knows.

2 MR. SULTAN: There's been --

3 MS. DIGIACOMO: And chose not to consult with.

4 THE COURT: But -- hold on. Are you going to show him
5 a report from Dr. Haskell?

6 MS. DIGIACOMO: I am not -- no, I can't since the
7 defense did not let me talk to him. But I would like --
8 I'm trying to lay the foundation to get into those
9 photographs as well.

10 THE COURT: But the problem is, is there's -- this is
11 just assuming that you have the information correct that
12 you're giving in the hypothetical.

13 MS. DIGIACOMO: And I will be able to with my -- one
14 of my experts establish.

15 MR. SULTAN: Establish what exactly?

16 MS. DIGIACOMO: It --

17 THE COURT: Hold on a second, though. You need to
18 stop, please.

19 MR. SULTAN: I'm sorry.

20 THE COURT: So --

21 MS. DIGIACOMO: Your Honor, the pathologist that I
22 have coming who is familiar with this area will say
23 sometimes there's blowflies, sometimes there's not. Just
24 like the witnesses I tried to bring in, just the CSAs that

1 respond to the scenes and the -- the detectives that
2 respond to these scenes and have been on hundreds of dead
3 bodies.

4 Here, we do not have blowflies on every dead body
5 that's left out.

6 THE COURT: I don't have a problem with you utilizing
7 a known treatise or research source or something else to
8 challenge his information. The problem is that's not what
9 you're doing. You're doing it from your own notes and
10 recollection. That's more the issue.

11 MS. DIGIACOMO: Well, no. I'm doing it from the
12 people I have talked to as well.

13 THE COURT: It's the appropriate way to do it, though.
14 So --

15 MS. DIGIACOMO: But he's an expert. I still think I
16 can challenge his --

17 THE COURT: But the problem is you have to challenge
18 it with something that's authoritative in the field. You
19 can't just do it based upon the notes that you've taken
20 doing your own research.

21 MS. DIGIACOMO: But, your Honor, I disagree. I
22 can -- I think he's an expert; I can pose him
23 hypotheticals as well.

24 THE COURT: There's a difference between --

1 MS. DIGIACOMO: I can --

2 THE COURT: -- a hypothetical and the way you did it.
3 But if you're going to pose a hypothetical, then rephrase.

4 MS. DIGIACOMO: I'll pose a hypothetical then.

5 BY MS. DIGIACOMO:

6 Q Would it change your opinion -- well, first of all,
7 your opinion is only that, in this case, because of the lack
8 of blowfly activity that most likely that the -- the death
9 occurred after evening hours, I guess is what you said?

10 A On the --

11 Q In this case?

12 A What date?

13 Q I'm sorry?

14 A What date are you referring to?

15 Q I'm talking about in this case. Your opinion as to
16 the death of the victim that you looked at, you said, most
17 likely occurred after death because of the lack of blowfly
18 activity; correct?

19 A Rephrase that one more time because I want to
20 make sure I'm following. Because I mean, are you speaking
21 of the 8th of the month or -- because, I mean, after dark,
22 it could be any day; right? I just want to make sure I
23 get --

24 Q I'm talking about your opinion in this case.

1 A Right.

2 Q With regard to the photographs that you looked at and
3 the opinion you came up with, it was your opinion on the 8th
4 he most likely, I guess, died after dark?

5 A In the evening.

6 Q In the evening.

7 A Yes.

8 Q And what do you mean by in the evening?

9 A Because it -- dark could be at night, like after
10 midnight. It's the 8th, but it's dark.

11 Q Okay.

12 A I'm just separating the two.

13 Q I'm just going by what defense counsel and what you
14 said.

15 A Right.

16 Q You had said dark, but let's go back.

17 A I think it's good to make sure we're clear on
18 that. I agree.

19 Q Tell me exactly what your opinion is in this case.

20 A So that death occurred after sunset on the 8th.

21 Q Do you know what time sunset was?

22 A I believe it was at 8:59, somewhere in that
23 region.

24 Q So you said the death occurred -- are you saying 100

1 percent that death occurred after sunset?

2 A I would say within a reasonable scientific
3 certainty, yes.

4 Q Reasonable. Now, would it change your opinion if you
5 knew here in Las Vegas that blowflies are not always found on
6 carrion that's been out --

7 THE COURT: Unless you have an objection, please sit
8 down.

9 MR. SULTAN: Objection, your Honor.

10 THE COURT: Okay. So what is it?

11 MR. SULTAN: That's not a hypothetical. It's asking
12 if he was surprised whether or not, and she's stating a
13 fact, your Honor.

14 MS. DIGIACOMO: I said would it change your opinion.

15 THE COURT: You know what? And I missed the whole
16 question because I was waiting for -- I didn't know why
17 you were standing up.

18 Can you ask the question again, please?

19 BY MS. DIGIACOMO:

20 Q I said would it change your opinion regarding your
21 reasonable certainty that the death occurred after dark
22 because of the lack of blowfly activity if you saw research or
23 saw dead bodies here in Nevada, in Las Vegas specifically,
24 that were outside during daylight hours, optimal conditions,

1 but zero blowfly activity?

2 A I would say that it's very much case specific. I
3 would be --

4 MR. SULTAN: I'm sorry.

5 THE COURT: I'm going to allow him to answer it,
6 but -- overruled.

7 THE WITNESS: It would be case specific. I'd have to
8 be very careful about saying that because in the instances
9 that you're describing, I don't know what the conditions
10 were -- the time of year, the location, the condition of
11 the body.

12 So I would -- I would want to know specifics of
13 that particular case before I rendered a decision on how
14 that impacts my conclusions in this case.

15 BY MS. DIGIACOMO:

16 Q Okay. So you'd want to see, like, photographs of
17 those?

18 A Well, I would want to see what you're basing that
19 hypothetical on.

20 Q Okay. So -- let me ask you with regard to
21 Dr. Haskell, you did not confirm -- or consult with him?

22 A No, I did not.

23 Q If the last four insect activity that he was asked to
24 evaluate for the Las Vegas Metropolitan Police or the

1 coroner's office regarding a dead body, if the last four he
2 found had zero blowfly activity but was only flesh fly
3 activity, would that change your opinion?

4 MR. SULTAN: Objection, your Honor.

5 THE COURT: What's the objection?

6 MR. SULTAN: Again, he -- he's asked to comment to a
7 study that he doesn't know anything about. This isn't a
8 hypothetical. This is some fact pattern from a case that
9 we don't know anything about, and that's not a proper
10 hypothetical for Dr. Tomberlin to comment on.

11 MS. DIGIACOMO: First of all, Dr. Haskell is an
12 expert that I believe they have consulted with, so it's
13 information they should have. But I'm asking him if this
14 would change his opinion.

15 THE COURT: I agree with the defense. It's sustained.

16 While you're looking, I have a question. So you
17 testified previously, right -- my notes are correct -- the
18 optimal temperature is, for lots of activity, would be
19 between 75 and 95 degrees. And we're referencing the
20 blowflies, I think you were talking about, when you said
21 that. Oh, shoot. And I just forgot my -- okay.

22 Any of the research that you've done or research
23 that you're aware of from learned treatises or other
24 sources that are utilized in your professional community,

1 is there -- have they ever come up with an outside range
2 of time at which colonization starts to occur -- okay.
3 The longest amount of time before colonization starts to
4 occur if at optimal temperatures during daylight hours.

5 THE WITNESS: So there are --

6 THE COURT: Do you understand what I'm asking?

7 THE WITNESS: I think so. Is there --

8 THE COURT: What's the longest period of time assuming
9 optimal temperatures, which would be between the 75 and 95
10 degrees and daylight hours which you indicated are more
11 active during the day versus the night, what is the
12 longest -- have there been any studies looking at the
13 longest amount of time before colonization starts to occur
14 within the blowfly community?

15 THE WITNESS: Yes. So one of the reviews that I
16 published a few years ago where I went and reviewed the
17 literature on this idea of decomposition, I was very
18 interested in this question of when do blowflies typically
19 colonize.

20 THE COURT: Yes.

21 THE WITNESS: And there were two studies that found
22 that colonization could occur much later. And when I mean
23 much later, I mean days. But this was in conditions where
24 the environment wasn't conducive for colonization. That

1 when the environment was appropriate, colonization
2 typically occurred within a few hours.

3 THE COURT: And appropriate being time of day as well
4 as the ambient temperature?

5 THE WITNESS: And how the body was stored. So like --
6 the research that I did in San Marcos, Texas, in May where
7 the temperatures can reach 95 degrees Fahrenheit, the body
8 that we received came from Minnesota. And it was chilled
9 to 40 degrees. So the body was held in a freezer
10 basically before it was given to us. So the body was
11 not --

12 THE COURT: Slow down a little the decomposition --

13 THE WITNESS: It would, yes.

14 THE COURT: -- and affect the odors and other things
15 that are --

16 THE WITNESS: Exactly, yes. So I've seen that occur.

17 We've also done studies in Texas where we have
18 monitored fly activity where we've taken freshly
19 euthanized pigs and put them out and watched the
20 decomposition process, and we get colonization within an
21 hour or two.

22 THE COURT: Okay. And are there any studies -- I
23 don't know how many different types of animals you've
24 looked at as far as how long it takes for their

1 colonization to occur under optimal conditions being
2 daylight hours and optimal temperatures.

3 Is there -- so pig was within an hour. Have you
4 looked at other creatures, and is it a similar period of
5 time? Or does it vary depending on the creature? Do
6 you --

7 THE WITNESS: I understand. So does the animal model
8 influence when it -- flies come in and colonizes. And
9 what --

10 THE COURT: I think that means -- I think -- you're
11 using all scientific terms. But animal model being?

12 THE WITNESS: The type of animal.

13 THE COURT: Human versus pig? Okay.

14 THE WITNESS: So we've done work with humans. We've
15 done work with pigs, chickens, reptiles. You name it,
16 we've probably watched it decompose.

17 So we typically see the same patterns. And the
18 beauty of our field is that we're talking several hundred
19 years of research and publications and looking at things
20 decompose --

21 THE COURT: Let me back you up a little bit.

22 THE WITNESS: Okay.

23 THE COURT: You said similar rates of the
24 colonization. You said the pig was one hour. Is that

1 similar to what you -- obviously in this case, the human
2 animal is what I'm interested in.

3 THE WITNESS: Yes.

4 THE COURT: So is it the same for a human, that it's
5 been approximately one hour?

6 THE WITNESS: Within a couple of hours.

7 THE COURT: Within a couple.

8 THE WITNESS: Yes.

9 THE COURT: I know that scientific is not -- I can't
10 give --

11 THE WITNESS: I would say anywhere -- anywhere --

12 THE COURT: What's my range?

13 THE WITNESS: Sure. I was going to say up to six
14 hours.

15 THE COURT: Okay. Thank you.

16 And I'm sorry.

17 BY MS. DIGIACOMO:

18 Q And I'm sorry. The study that you did, were you
19 referring to the one that you published a paper on in 2012?

20 A No. This is a different paper.

21 Q Okay. But in that paper, you stated that even with
22 blowflies, their arrival on carrion remains can vary from
23 seconds to minutes or days; correct?

24 A Yes.

1 Q And you also said, "Unfortunately, at this time, a
2 true appreciation of the variation surrounding arrival
3 patterns and the regulating variables is limited in the
4 literature."

5 A Yes.

6 Q So it is possible for no insect activity or blowflies
7 to take place for days?

8 A Yes. Under conditions that would be considered
9 not ideal.

10 Q So only at those times?

11 A Based on my understanding of 24 years of
12 research, yes.

13 Q But you've never done any research in the Las Vegas
14 valley?

15 A I have not.

16 Q Okay. And you would agree that Texas and Minnesota
17 are more humid than the climate here?

18 A Yes.

19 Q Does that affect the optimal conditions?

20 A Humidity plays a role in development of the
21 insect, not necessarily in flight and attraction to
22 carrion.

23 Q So it is your testimony here today that every dead
24 body will get blowfly activity as long as it's optimal

1 conditions, every single body?

2 A Under optimal conditions, I would expect that if
3 a body is --

4 Q You would expect. That's not what I asked you. I
5 said can you sit here today --

6 MR. SULTAN: Objection, your Honor.

7 THE COURT: Hold on.

8 MR. SULTAN: Can he answer the question?

9 THE COURT: I don't think she finished her question,
10 so let's finish the question --

11 BY MS. DIGIACOMO:

12 Q I'm sorry. I'm asking you can you sit here and say
13 that every dead corpse that is outside, optimal conditions,
14 will get blowfly activity?

15 A No.

16 Q Okay. You can say you expect it, but you can't say
17 that will happen; correct?

18 A So I'm just going back to the previous question
19 and digesting that in my mind. Under all conditions --
20 under optimal conditions in every instance, there would be
21 blowfly colonization. I -- I said no, but the reason
22 being is you have to have blowflies present. I mean,
23 that's one thing; right? So you could have a body that's
24 in an environment that's optimal but no blowfly activity

1 and not have colonization.

2 Q Okay. So it is possible to have optimal conditions
3 and no blowfly colonization?

4 A Sure. You could have a body in a house at 72
5 degrees Fahrenheit and have the windows closed and not
6 have any flies in it.

7 Q Okay. But could you have that same body in a house
8 with no blowfly activity and the windows are open and the
9 temperatures are optimal? It's in August here in Las Vegas.

10 A For a short period of time, yes.

11 Q For a short period of time. What if it was four
12 days?

13 A I would say that's highly unlikely.

14 THE COURT: When are blowflies not present?

15 THE WITNESS: Typically at night when the
16 temperature's low, if it's raining or it's really windy.

17 THE COURT: Okay. So really low -- temperatures
18 really low, raining, and what else?

19 THE WITNESS: Windy.

20 THE COURT: Any other times blowflies would not be
21 present within the environment? And -- okay. If you're
22 outside, other than lower temperatures, rainy, or windy.

23 THE WITNESS: Somebody applies insecticides in the
24 area could dampen populations.

1 THE COURT: All right.

2 THE WITNESS: So if you put insecticide on a dead
3 body, it can prevent colonization.

4 THE COURT: Okay. Thanks. Let me ask you a question,
5 and this is more of curiosity since the body was found
6 outside, obviously.

7 If a body is inside a dwelling and the windows
8 aren't open, you said something about blowflies will
9 eventually develop.

10 THE WITNESS: They'll find a way inside and colonize
11 the body.

12 THE COURT: Just through the cracks and crevices
13 because are they -- they're that sensitive to whatever
14 chemicals or odors being given off by the decomposing
15 body?

16 THE WITNESS: Yes. I've seen cases where bodies have
17 been a mile offshore and colonized on a boat.

18 THE COURT: Because they can travel pretty far?

19 THE WITNESS: They can travel.

20 THE COURT: Okay. Thank you.

21 BY MS. DIGIACOMO:

22 Q So you're saying even in a house with the windows
23 shut, they will colonize?

24 A Yes.

1 Q Even here in Las Vegas?

2 A Even in Las Vegas.

3 Q Okay. Every single dead body?

4 A I can't say every single dead body, no.

5 Q Because it is possible that blowflies -- or there's
6 not insect colonization on a body outside or inside, however
7 you want, whenever the conditions are optimal. It is
8 possible; correct?

9 A Yes, it is possible.

10 THE COURT: But is it --

11 THE WITNESS: It's highly unlikely.

12 THE COURT: What's the standard? Is it possible to a
13 reasonable degree of medical certainty, medical
14 probability?

15 THE WITNESS: I would say that --

16 THE COURT: Or is it not?

17 THE WITNESS: I -- I have -- I will not exclude all
18 possibilities because you never know what the conditions
19 are going to be. If I were to make a scientific
20 conclusion -- draw a scientific conclusion on
21 decomposition is that insects are going to find that body
22 and they're going to colonize it. And they're going to do
23 it fast because that's what their ecology is. If they
24 don't do it, they can't have offspring. So they're very

1 good at locating these resources.

2 That's what makes the field of entomology so
3 valuable within forensics is that these insects are
4 extremely good at locating dead bodies and colonizing it.
5 And we even see cases where they colonize living bodies in
6 nursing homes and hospitals and that sort of thing.
7 They're very, very good at locating these resources.

8 THE COURT: Okay.

9 BY MS. DIGIACOMO:

10 Q But again, you don't know about the Las Vegas area;
11 correct?

12 A In terms of experience --

13 Q Yes.

14 A -- no.

15 Q Okay.

16 MS. DIGIACOMO: And, your Honor, I would renew my
17 motion to be able to show him those photos to pose him
18 hypotheticals that were -- regarding the body found
19 outside and whether or not he sees any blowfly activity on
20 it.

21 THE COURT: The problem is, again, the same thing.
22 You don't know the specifics pertaining -- I mean, it's
23 comparing apples to oranges. Just -- see the
24 photographs --

1 MS. DIGIACOMO: Your Honor --

2 THE COURT: -- but those photographs you don't know
3 the location. There's been -- whether it was rural, city,
4 barren, Dumpster, the temperatures, the time of the day,
5 how long the body was there. I mean, there's just so many
6 variables that are not applicable to this case.

7 MS. DIGIACOMO: But, your Honor, I disagree. How are
8 they not applicable to this case if in Las Vegas we have
9 had dead bodies outside with these optimal conditions he
10 has discussed and there had been zero blowfly activity?
11 There are not eggs laid. There's nothing. How is that
12 not relevant --

13 THE COURT: Okay. So where is the information that
14 indicates that the conditions that you see in those
15 photographs are comparable to the conditions in this
16 particular case? Since obviously the temperature varies
17 to a great degree.

18 MS. DIGIACOMO: I had noticed the CSA who was at the
19 scene for -- for both of these. The one that was inside
20 the house, the body was there for four days. No insect
21 activity other than ants. I had that CSA noticed. You
22 excluded him.

23 This one I had a CSA noticed as well where this
24 again was in August of 2016, body outside, sunny day, warm

1 day. The cornea had clouded over, so it had been out
2 there at least two or three hours. And there is zero
3 insect activity, not one egg laid.

4 So I'm just saying how is that not relevant?
5 These entomologists that are coming in, have never done
6 cases here except Dr. Haskell, which the defense is not
7 calling. So I just -- I'm sorry, your Honor. I just
8 don't see how it's not relevant that in climate -- more
9 often than not, we do not have blowfly activity. And
10 that's from the -- the pathologist as well.

11 THE COURT: Okay. Is there anything else? I know you
12 want to stand up and say something.

13 MR. SULTAN: I tried to remain in my seat, your Honor.
14 I mean, if you want to hear my position on this, I don't
15 know if --

16 THE COURT: I'd like to make a record, yes.

17 MR. SULTAN: Your Honor, our position is what we had
18 stated before. There's, as Dr. Tomberlin has testified,
19 there are so many variables that go into blowfly activity
20 for these optimal conditions. I think your Honor was
21 hitting on this point.

22 We don't know any of these actual ground truths
23 with these pictures. We don't know the temperature. The
24 State has represented being warm, but there is actually a

1 specific number that actually has meaning to it. We don't
2 have that information. We don't know anything about
3 whether or not that body was moved to that location, where
4 that -- where the decedent was, any of that information,
5 any of those foundational information that would make such
6 an inquiry have any sort of relevance to this proceeding.

7 I mean, the pictures are significantly different
8 from my glancing of it in that Mr. Bailey's body was
9 literally covered with blood. There is blood everywhere.
10 There's scars everywhere. The doctor testified how that's
11 a big receptor for blowfly activity.

12 And I don't think I saw any of that level of
13 bleeding in those -- in those pictures. I mean, that
14 alone just -- just glancing at those pictures is a big
15 difference that takes it into an apples-and-oranges
16 situation that your Honor wanted to avoid in this
17 situation.

18 So without knowing these ground truths, without
19 knowing the facts that would make such an inquiry
20 relevant, this isn't just posing a hypothetical. This has
21 absolutely no relevance, your Honor.

22 MS. DIGIACOMO: Your Honor, this expert just
23 testified it would be highly unlikely that that could
24 occur. It has occurred in the Las Vegas area, and the

1 fact that I can't bring in these witnesses or
2 cross-examine I think clearly stifles the State in trying
3 to show why their entomology evidence does not establish a
4 time of death after dark because it is routine here that
5 we do not have blowfly activity on bodies that expire with
6 optimal conditions.

7 THE COURT: Is there anything else?

8 MR. SULTAN: And, your Honor, if she has an expert --
9 she's noticed an expert witness who, if they want to
10 testify about their experience in Las Vegas, that person
11 can testify about their experience in Las Vegas.

12 But this line of inquiry with these pictures with
13 this information is totally inappropriate given the lack
14 of information on ground truths about that, which would
15 affect -- which would impact the relevance and import of
16 this information.

17 THE COURT: All right. Is there anything else before
18 I make a ruling? Okay.

19 So just to go back, the reason I did not allow
20 the CSAs to testify is I disagreed with the State that
21 they were lay witnesses. I believe that they were expert
22 witnesses. They were not testifying within something
23 that's within the knowledge and purview of the ordinary
24 person, rather that they were testifying to things that

1 they had specialized information and specialized training,
2 which gave them the ability to testify to what you wanted
3 them to testify to.

4 The problem was they weren't properly disclosed
5 as experts and all the other things that are required of
6 expert disclosures. They just didn't happen. There
7 wasn't the CV. There wasn't a report. There wasn't
8 anything. That's why I didn't let them in.

9 And they certainly would be the individuals that
10 would lay the foundation for those photographs because
11 without some kind of testimony for foundation, again, it's
12 comparing apples to oranges. There's so many other
13 variables, which have been discussed over the course of
14 the two days, which would be the location of the bodies
15 and the -- just from the one I can see ten feet away, it
16 appears the location of the body or the lump that was seen
17 in the picture doesn't appear to have any similarity to
18 this situation, which is a dead body found behind a brick
19 wall by a Dumpster with organic substances somewhat around
20 him.

21 The temperatures makes a difference. We have no
22 testimony to indicate what the temperatures were. So you
23 can't compare whether or not there was optimal
24 temperatures in that case or the temperatures in that case

1 were consistent with the temperatures in this case.

2 There's just too many variables, and there's just
3 no way to lay the foundation for the reasons I indicated.
4 Again, those people you wanted to have were not properly
5 noticed as experts.

6 MS. DIGIACOMO: And, your Honor, just for the
7 record --

8 THE COURT: I'm not going to argue with you about it.
9 If you would like to further the record, then that's fine.

10 MS. DIGIACOMO: I would like to make my record in
11 case this goes up.

12 THE COURT: Sure.

13 MS. DIGIACOMO: But as I stated -- and this witness's
14 stated and the last witness stated with the photographs of
15 the defense, the eggs on a body can be very -- I guess,
16 seen from -- with the naked eye. And so all I had
17 intended to call those witnesses for was based upon
18 whether they could see eggs or not. That was not anything
19 that they've been specially trained on or expert. It's
20 what any layperson should have been able to see. It was
21 just they've seen more dead bodies than maybe the
22 layperson.

23 THE COURT: All right. And again, I don't believe
24 that being able to identify eggs is within a purview of a

1 lay witness, even if that's what you were going to utilize
2 that expert for. But we've already -- you've made a
3 record on this. Let's move on, please.

4 BY MS. DIGIACOMO:

5 Q I'm sorry, Doctor. We got a little sidetracked. Is
6 it your testimony that every single dead body in the Las Vegas
7 area under optimal conditions at some point will get blowfly
8 activity?

9 MR. SULTAN: Objection, your Honor. Asked and
10 answered.

11 THE COURT: I'm sorry. I missed the question. Please
12 ask it again, and then I'll rule on your objection.

13 BY MS. DIGIACOMO:

14 Q Is it your testimony that every dead body found in
15 Las Vegas, when there's optimal conditions, will at some point
16 get blowfly activity before being found?

17 THE COURT: Hold on. What's your objection?

18 MR. SULTAN: Asked and answered, your Honor.

19 MS. DIGIACOMO: I changed it.

20 THE COURT: I think that actually he did answer this
21 question, and there was a couple parts to it. It was
22 assuming optimal conditions, availability of blowflies
23 and --

24 MS. DIGIACOMO: Right. But based upon what he just

1 testified to, now I'm asking him about "some point."

2 THE COURT: Okay. I'll just let you answer it.

3 THE WITNESS: Could you repeat the question, please?

4 BY MS. DIGIACOMO:

5 Q Every single corpse found in the Las Vegas area under
6 optimal conditions when blowfly activity should occur, at some
7 point -- it's your testimony that at some point those bodies
8 will always have blowfly colonization; correct? Always?

9 A So I think it's important something you brought
10 up. And I think this needs to be really hammered home,
11 and that is it's not just blowflies.

12 I mean, like you pointed out, flesh flies can
13 come in and colonize too. So when I look at remains, I'm
14 not just scanning an image looking for blowfly eggs. I'm
15 looking for larval activity as well. So it could be other
16 flies that come in and colonize and do that.

17 In -- it's my conclusion that every case, every
18 single case under optimal conditions would I expect to see
19 blowfly colonization at some point? Yes, I would.

20 Q But it could be days?

21 A That's not -- not under optimal conditions.

22 Q So what would be at some point you would expect it?

23 A Under optimal conditions?

24 Q Yeah. Minutes?

1 A Oh, so under optimal conditions, I would say that
2 if you're dealing with daylight hours, I would say at some
3 point during the daytime, you would see colonization.

4 Q Okay. Now, at some point during the daytime?

5 A Yes.

6 Q So within hours?

7 A Yes.

8 THE COURT: I think this -- I also asked him this
9 because he gave me the pig example, and he said it was an
10 hour on a pig. And I asked if it was likewise an hour on
11 a human or other creature.

12 BY MS. DIGIACOMO:

13 Q But again, all those studies were done in
14 environments not here; correct?

15 MR. SULTAN: Objection, your Honor. That's been asked
16 and answered several times.

17 THE COURT: Overruled.

18 THE WITNESS: So there have been studies in similar
19 environments, yes, that have shown colonization occurs --

20 BY MS. DIGIACOMO:

21 Q That's not my question. All the -- all the studies
22 you have done when you talked about putting the dead bodies
23 out, they were not here?

24 A Yes, you're correct.

1 Q Okay. You said that there were studies done in
2 similar climates --

3 A Yes.

4 Q -- but that's not here; correct?

5 A Correct.

6 Q And one of the most important things with looking at
7 the developmental or success -- succession methods is
8 location, geographical location; correct?

9 A It's an important factor, yes.

10 Q All right. Do you even know what geographical
11 location Las Vegas falls in?

12 A I'm not sure I follow the question because I mean
13 I could say --

14 Q Well, if -- you'd agree the United States is broken
15 up into different geographical locations -- or geological
16 locations, regions?

17 A I'm not a geologist.

18 Q Okay. So you don't know what the geographic region
19 is for Las Vegas; correct?

20 A Based on whose definition? I mean, there's my
21 definition. I would say being from Texas that it's the
22 western United States. I don't know what someone that
23 does geography does for a living would say it is.

24 Q Okay. Well, if it was the Mojave Basin and Range,

1 are there any entomological studies that have been done in
2 that specific region?

3 A I'd have to look and see what you're defining as
4 the Mojave Basin and Range to answer that question.

5 Q Okay. But you say you've seen -- read about studies
6 in similar locations?

7 A Similar environments.

8 Q Similar environments. And what makes these other
9 environments similar to Las Vegas?

10 A High temperature, low humidity, low rainfall.

11 Q That's it?

12 A That's some examples of factors that I look into,
13 yes.

14 Q Nothing about blowfly population in those areas
15 versus here?

16 A Well, I don't know if that goes into defining
17 what the Mojave Basin region is.

18 Q No. But I'm saying the other areas that you said
19 that you had done -- you read about studies, Southern
20 California, Arizona, New Mexico. Okay? Are there any parts
21 of those studies that talk about the blowfly population there?

22 A Yes. They do talk about blowfly populations,
23 yes.

24 Q Okay. And what's their blowfly population versus Las

1 Vegas?

2 A So I can't answer that question because -- our --
3 do you want the species or do you want the numbers?

4 Q Well, the numbers. What's our blowfly population in
5 Las Vegas?

6 A I can't answer that question.

7 Q Okay. Because there's no studies that have put out
8 that information; correct?

9 A Nothing beyond my personal observation of blowfly
10 activity.

11 Q And you just saw one on your dinner plate?

12 A I have seen blowflies land on my dinner plate,
13 yes, here.

14 Q But that's it. You haven't seen any blowflies
15 landing on dead bodies here?

16 A I hope not, no. I mean, I just don't go around
17 looking for dead bodies.

18 Q Okay. And in that study that you wrote in 2012, you
19 wrote, "Forensic entomologists are often applying data from
20 one region to another with the hope that they are similar and
21 allow for accurate PMI estimates to be made, something that
22 could prove difficult to defend in a court of law."

23 Correct? You wrote that?

24 A I did.

1 Q But you're okay, as you sit here today, to use
2 information from another geographic region to predict what's
3 going to happen in Las Vegas?

4 A That -- that's in reference to development data.

5 Q Okay.

6 A And I can explain that if you --

7 Q So it doesn't affect what you're testifying about
8 here today?

9 A Not in terms of the general -- generalities of
10 what you expect in terms of colonization and succession
11 patterns.

12 What this is referring to is saying that the
13 development rate of an insect in a population here is the
14 same as it would be in another region of the US. So if I
15 was trying to apply development data, actual -- what it
16 takes to get from an egg to adult, that would concern me.

17 The idea that flies are attracted and colonizing
18 carrion quickly, that's a global concept. That's not
19 restricted to one part of the world. That's something
20 that's been published in over 700 years of research around
21 the world where flies have been attracted to minute
22 particles of blood within minutes of being laid out. This
23 isn't a concept that's being taken from one region and
24 being applied to another. This is --

1 Q So you just --

2 A -- global.

3 Q -- that's the generality?

4 A That is a very well accepted principle within
5 forensic entomology, yes.

6 Q Right. Because that is generally what can be
7 predicted with these insects?

8 A Around the world, yes.

9 Q Okay. But you'd agree that based upon the region, it
10 could -- the generalities could fail to be applied accurately?

11 A I would have a very difficult time accepting that
12 conclusion.

13 Q You'd have a difficult time accepting, but it is
14 possible?

15 A If blowflies --

16 MR. SULTAN: Objection, your Honor.

17 THE COURT: Hold on.

18 THE WITNESS: That blowflies aren't attracted to
19 carrion?

20 BY MS. DIGIACOMO:

21 Q No.

22 MR. SULTAN: Argumentative.

23 BY MS. DIGIACOMO:

24 Q That blowflies -- that --

1 THE COURT: (Inaudible).

2 BY MS. DIGIACOMO:

3 Q -- I'm sorry. No. Just in this area, you're -- let
4 me strike that.

5 Your opinion here is you're saying that no blowfly
6 eggs or flesh fly larva or whatever means the death occurred
7 after dark; correct? Or after evening hours, I think you
8 said?

9 A In this particular case, the -- most likely
10 that's what occurred, yes.

11 Q Most likely?

12 A Yes.

13 Q You can't say with 100 percent certainty that's what
14 occurred?

15 MR. SULTAN: Objection, your Honor. Asked and
16 answered.

17 THE COURT: Sustained.

18 BY MS. DIGIACOMO:

19 Q But it is your -- your, I guess, premise is based
20 upon the generalities that every dead body in optimal
21 conditions during the day will attract blowflies?

22 MR. SULTAN: Objection, your Honor. Asked and
23 answered.

24 MS. DIGIACOMO: I'm asking that's the basis of his

1 opinion.

2 THE COURT: Overruled.

3 BY MS. DIGIACOMO:

4 Q Correct?

5 A Could you repeat the question, please?

6 Q Yeah. Your opinion that most likely the death
7 occurred in the evening hours is based upon the general
8 knowledge across all regions of how blowflies will normally
9 land on a corpse if there's optimal conditions present?

10 A Yes.

11 Q Are there certain types of bodies that blowflies
12 won't like? Certain types of corpses that blowflies won't
13 like?

14 A In terms of defining, like, that would be
15 colonized?

16 Q Yes.

17 A Yes.

18 Q What? What are those?

19 A Remains in late stages of decomposition, of
20 skeletonized remains, treated with insecticides.

21 Q What about if a body is really dried out?

22 A That's the skeletonized.

23 Q No. I mean like just died, you know, within days but
24 out in the middle of the desert, dried out?

1 A Like mummified?

2 Q Yes.

3 A You would expect no blowfly activity.

4 Q If it was mummified?

5 A Correct, yes.

6 Q So it is possible here that there could be times when
7 blowflies also wouldn't be attracted to a carrion because the
8 carrion wasn't the optimal, I guess, feeding ground for it?

9 A Yes.

10 Q Okay. How many times have you made a determination,
11 such as in this case, by negative blowfly evidence or any
12 insect activity that's negative?

13 A So the lack of insect negative?

14 Q Yes.

15 A One other case.

16 Q With regard to the blowfly eggs, you said that
17 they're kind of clump masses. So are they -- if they're on
18 the eyes or around the mouth, are they readily identify --
19 seen, I guess?

20 A I --

21 Q Large clumps?

22 A I think so, yes.

23 Q So is it possible, though, to just have one or two?

24 A That's highly unlikely.

1 Q Highly unlikely?

2 A Yes.

3 Q But it is possible?

4 A If the fly's disturbed, it is possible that she
5 will not finish laying her eggs. But if given an
6 environment where there's no disturbance, then it would be
7 expected she would complete ovipositing.

8 Q Okay. So -- now, you said that you were hired by the
9 Innocence Project, I think it was February?

10 A I was contacted in February.

11 Q Okay. And then when was that you were hired?

12 A I cannot tell the specific date. I'd have to go
13 back and look at my files.

14 Q Okay. And you said that they're just paying you your
15 salary for while you're taking leave without pay?

16 A Yes.

17 Q And how long did you take leave without pay for?

18 A Hopefully just today.

19 Q Okay. So how much is that?

20 A So I believe that's \$750.

21 Q Okay. And then what about were there any other
22 expenses associated with coming in, like flight, hotel room,
23 food?

24 A Yes. They booked the flights for me to come

1 here.

2 Q Okay. And did you get a per diem for food?

3 A That's a good question I should have asked.

4 Q It's not too late. Did you -- was there any sort of
5 charge just for the consultation?

6 A No.

7 Q And what -- I know you talked a little bit about
8 this, but what other reports did you have when you did your
9 review of this case?

10 A None other than the -- the autopsy report and I
11 believe the CSI report were the only two that I was given
12 to -- along with the photographic evidence -- for
13 assessing the case.

14 Q So you weren't given any reports by any other
15 entomologists?

16 A Not during the time of my assessment.

17 Q And since that time, have you been given other
18 reports?

19 A I have seen other reports since then, yes.

20 Q And who were those by?

21 A I believe, off the top of my head, Gail Anderson,
22 Linda-Lou O'Connor. That's the two that come to my mind.

23 Q Okay. Thank you.

24 THE COURT: Regarding this particular case?

1 THE WITNESS: Yes.

2 THE COURT: And did those two individuals' opinions,
3 did they affect your opinions in any way?

4 THE WITNESS: No.

5 THE COURT: Okay.

6 BY MS. DIGIACOMO:

7 Q Now, when you were shown Defendant's Exhibit E --

8 MS. DIGIACOMO: May I approach, your Honor?

9 THE COURT: You may.

10 BY MS. DIGIACOMO:

11 Q Okay. I'm going to show you -- this is the hourly
12 weather report for July 8th. And this is the one that you
13 were looking at earlier.

14 A Yes.

15 Q Okay. And you said something about the heat index?

16 A Yes.

17 Q What is that?

18 A So that's in combination with humidity. In
19 Texas, it's notorious. It could be 90 degrees and it
20 feels like it's 110 degrees.

21 Q Okay. So for us -- so at certain times of the day on
22 July 8th, does it show that the heat index is actually
23 different than the temperature outside?

24 A It does.

1 Q Okay. And what -- what times are those?

2 A Starting -- so they start recording at 8:56 a.m.,
3 and there's differences throughout.

4 Q Okay. So are the differences -- do they make the
5 weather hotter or cooler?

6 A In this case, it made it cooler.

7 Q So every point from -- I'm sorry, you said?

8 A 8:56 a.m. until 11:56 p.m.

9 Q And then actually, we go to the --

10 A That's after midnight.

11 Q Oh, I'm sorry. Okay. I didn't realize we were on
12 the next day.

13 Okay. So the only time that the heat index between
14 8:56 a.m. and 11:56 p.m. did not make it cooler was at --

15 A So there's this one here --

16 Q 82 -- oh, sorry.

17 A And then I think that's the only one that was
18 warmer.

19 Q Okay. So let me -- let me put this up on the screen
20 so the judge can see.

21 MS. DIGIACOMO: All right. So, your Honor, I'm
22 putting on Defense Exhibit E. Okay.

23 BY MS. DIGIACOMO:

24 Q So let's look at 8:56 a.m. The temperature recorded

1 is 82 degrees --

2 A Yes.

3 Q -- correct? And then you said because of the heat
4 index, which involves the humidity, at 8:56 a.m., it actually
5 felt like 83 degrees?

6 A Yes.

7 Q That's what this says. So 9:56, the temperature
8 reads as what?

9 A I believe 84.9 degrees Fahrenheit.

10 Q But the heat index makes the temperature here?

11 A I believe it says -- I'm feeling my age here --
12 84.8 degrees Fahrenheit.

13 Q And so now let's skip down to, like, 12:56 p.m. The
14 temperature outside is 90 degrees, but what is the heat index?

15 A 88.8 degrees.

16 Q All right. So from looking at the heat index -- and
17 I'm not sure if you can see this -- would you agree with me
18 that the hottest the heat index was, was 93.4 degrees at
19 5:00 -- 4:56 p.m.?

20 A Yes.

21 Q Okay. Thank you. So unless -- is it fair to say
22 unless a study is done in Las Vegas, you can't say if it would
23 be minutes or hours or even days or whatever that blowflies
24 would, I guess, get to a body and start to lay eggs?

1 A Those studies help, but even in those
2 circumstances, you still want to consider the uniqueness
3 of the study.

4 So it is informative, but there are still gaps in
5 knowledge there because each instance is unique to itself.
6 The conditions are unique. The animal that you might be
7 using is unique, a pig versus human. All that will play a
8 role in terms of what you would expect to happen.

9 Q So basically, when you -- when all these studies are
10 read in the other regions, basically what you're doing is
11 analogizing what happens there to here?

12 A I'm taking a biological principle that's been
13 accepted throughout the world and applying it in this
14 region.

15 Q But that's -- I understand there's -- it's a
16 universal principle, but you would agree that studies have
17 shown in some climates versus other climates the blowfly
18 activity could be minutes or it could be hours?

19 A Sure.

20 Q So you're taking those principles and applying them
21 to Vegas, analogizing them?

22 A Yes. So I'm -- I've yet to see a study under
23 optimal conditions where you see delayed colonization for
24 an extended period of time of, say, 10 hours, 12 hours

1 under optimal conditions. I -- that is just something
2 that I haven't seen yet.

3 Q You haven't seen yet, but it is possible it could
4 happen?

5 A I would say that might be possible, yes.

6 Q Those other studies that were done in Southern
7 California and New Mexico and Arizona, when were those studies
8 done?

9 A They've ranged from the '70s up to the late
10 20s -- 2010s, like 2009, 2008.

11 Q And are there even any forensic entomologists in Las
12 Vegas?

13 A There are no forensic entomologists in Las Vegas.

14 Q So that would probably explain why no one has studied
15 it here?

16 A No one has the heart. Maybe that will change.

17 Q And also with regard to, you know, when you were
18 talking about the optimal conditions here on July 8th, you
19 said sunny, it was warm to hot, winds were low, no rain.
20 Remember that?

21 A Yes.

22 Q Okay. But actually, when looking at this hourly
23 weather report, can you see that?

24 A Yes.

1 Q It's actually mostly cloudy, scattered clouds or hazy
2 all day; correct?

3 A Yes.

4 Q Okay. So it really wasn't sunny; correct?

5 A Correct.

6 MS. DIGIACOMO: I have nothing further.

7 THE COURT: Redirect?

8 MR. SULTAN: Your Honor, can we just have the Court's
9 indulgence for one moment?

10 THE COURT: Okay.

11 THE WITNESS: I'm good. Thanks. Thank you.

12 MR. SULTAN: Nothing further, your Honor.

13 THE COURT: All right. Doctor, thank you for your
14 time. Have a safe flight.

15 THE WITNESS: Thank you.

16 THE COURT: Do you have any witnesses scheduled for
17 today?

18 MS. POTKIN: We don't, your Honor. We'd have our
19 first witness again tomorrow at 1:00 o'clock when they
20 were scheduled.

21 THE COURT: All right. Anything by the State or the
22 defense before we go off the record?

23 MS. DIGIACOMO: No, your Honor, other than for
24 scheduling. I have one witness that has to testify on

Tomberlin CV 2020

To Whom It May Concern:

This signature page is to verify that the curriculum vitae being submitted is the most current.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffery K. Tomberlin", written in a cursive style.

Jeffery K. Tomberlin

Tomberlin CV 2020

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EDUCATION

- PhD, Entomology, University of Georgia. August 2001. Dissertation title: Biological, behavioral, and toxicological studies on the black soldier fly (Diptera: Stratiomyidae).
- MS, Entomology, Clemson University. August 1996. Thesis title: A comparison between terrestrial and submerged carrion during the winter and summer in upstate South Carolina.
- B.S., Biological Sciences, University of Georgia. June 1993.

EMPLOYMENT

- Professor, AgriLife Research Fellow, Presidential Impact Fellow. 2019-present. Forensic entomology, Department of Entomology, Texas A&M University. 60% research, 35% teaching, 5% service.
- Professor and AgriLife Research Fellow. September 2018- 2019. Forensic entomology, Department of Entomology, Texas A&M University. 60% research, 35% teaching, 5% service.
- Associate Professor and AgriLife Research Fellow. January 2016- August 2018. Forensic entomology, Department of Entomology, Texas A&M University. 60% research, 35% teaching, 5% service.
- Associate Professor. September 2012-January 2017. Forensic entomology, Department of Entomology, Texas A&M University. 60% research, 35% teaching, 5% service.
- Assistant Professor. July 2007-August 2012. Forensic entomology, Department of Entomology, Texas A&M University. 50% research, 50% teaching.
- Assistant Professor and extension specialist, December 2002-July 2007. Livestock and forensic entomology, Department of Entomology, Texas A&M University. 25% research, 75% extension.
- Post-doctoral research associate, August 2001-November 2002. Insect Behavior, Department of Biological and Agricultural Engineering, University of Georgia and USDA-ARS, Tifton, Georgia. Co-advisors: Dr. W. Joe Lewis and Dr. Glen Rains.
- Graduate research assistant, June 1998-July 2001. Livestock and forensics, Department of Entomology, University of Georgia.
- Graduate research assistant, August 1996-May 1998. Forensic entomology, Department of Entomology, University of Hawaii at Manoa.

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- Graduate research assistant, August 1994-July 1996. Forensic entomology, Department of Entomology, Clemson University.

AWARDS

- Crime Scene Investigation Scientific Area Subcommittee, Distinguished Group Service Award. 2020. Organization of Scientific Area Committees for Forensic Science, National Institute for Standards and Technology.
- Presidential Impact Fellow. 2019. Texas A&M University.
- Forensic & Investigative Sciences Program ranked #1 by Bachelor Degree Center. 2019. <https://www.bachelorsdegreecenter.org/best-forensic-science-degree/>
- Pathology/Biology Section Outstanding Achievement in the Forensic Life Sciences. 2019. Pathology/Biology Section, American Academy of Forensic Sciences.
- AgriLife Research Fellow. 2018. College of Agriculture and Life Sciences, Texas A&M University.
- TEDx TAMU. Pioneering Change. 2016. Texas A&M University.
- Faculty, Staff & Advisor Recognition. 2015. Texas A&M University Veteran Resource & Support Center. Texas A&M University.
- Research Mentorship Award. 2015. Entomology Graduate Student Association, Department of Entomology, Texas A&M University.
- Teaching Mentorship Award. 2015. Entomology Graduate Student Association, Department of Entomology, Texas A&M University.
- Forensic & Investigative Sciences Faculty of the Year. 2012. Department of Entomology, Texas A&M University.
- Texas Environmental Excellence Award in the Agriculture, 2nd Place. 2009. Texas Commission on Environmental Quality.
- Student Led Award for Teaching Excellence (SLATE). 2009. Texas A&M University. Ranked 13th out of 45 individuals receiving the award with 320 applicants from across the Texas A&M University System submitted for the award.
- Platinum Award for DVD entitled "*Forensic entomology: collection and preservation of entomological evidence for court*". 2008. Ava Awards.
- Outstanding Faculty Award. 2008. Undergraduate Entomology Organization, Department of Entomology, Texas A&M University.
- Texas Environmental Excellence Award in the Agriculture, Finalist. 2008. Texas Commission on Environmental Quality.
- Telly Award for DVD entitled "*Forensic entomology: collection and preservation of entomological evidence for court*". 2007.
- Meatra D. Harrison Professional Development Scholarship. 2004. Texas Cooperative Extension, Texas A&M University.
- Orkin Livestock Entomology Award: Outstanding Graduate Student. 2000. Livestock Insect Workers Conference, St. Augustine, Florida.
- Outstanding PhD Student Scholarship. 1999. Georgia Entomological Society.
- Outstanding Student Presentation. 1996. Southeastern Branch Student Award: Entomological Society of America. Biloxi, Mississippi.
- J.H. Cochran Memorial Scholarship: Outstanding Graduate Student in Entomology. 1995. South Carolina Entomological Society. Charleston, South Carolina.
- Outstanding Chemistry Student. 1991. Middle Georgia College.

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COMPETITIVE GRANTS FUNDED (Approx. \$3,755,550.00 received)

- National Science Foundation/University Cooperative Research Centers Program. 2019-2020. \$14,999. Planning IUCRC at Texas A&M University: Center for Environmental Sustainability through Insect Farming (CEStIns).
- Texas A&M AgriLife Research Insect Vector Disease Program. 2016-2017. \$97,990.00. Mosquito Response to Volatile Organic Compounds associated with quorum sensing pathways.
- Texas Invasive Ant Research and Management Seed Grant Program. 2015-2017. \$94,200.00. Management of red imported fire ants with baits enhanced by novel matrices, attractants, and insecticidal compounds. Co-authored with Dr. Robert Puckett (PI), Department of Entomology, Texas A&M University.
- National Science Foundation Industry/University Cooperative Research Centers Program. 2017-2021. \$749,840.00. Phase I IUCRC at the University of South Alabama: Center for advanced research in forensic science. Alec Yasinac (PI), William Glisson (co-PI), Aaron Tarone (co-PI). Participated through 2019.
- Defense Advanced Research Projects Agency. 2017-2019. \$499,375.00. Microbial camouflage of valued Resources as a mechanism for manipulating fungal pest response. Co-authored with Dr. Karen Wooley (co-PI) and Dr. Michael Toews (co-PI).
- United States Department of Agriculture. 2016-present. \$95,000.00. Interkingdom interactions of bacteria, animal waste and arthropods. Co-authored with Tawni Crippen (PI). Award #: 58-3091-6-032.
- National Institute of Justice. 2016-2019. \$149,634.00. Evaluating and improving practices employed by U.S. forensic scientists to locate critical literature for use in investigation. Co-authored with Mrs. Sarah Bankston (PI) and Mrs. Laura Sare (co-PI). Award number: 2016-R2-CX-0054.
- National Institute of Justice. 2016-2019. \$540,545.00. Investigating upper thermal limits of forensically important blow flies to improve testimony in forensic entomology. Co-authored with Dr. Aaron Tarone (PI). Award number: 2016-DN-BX-0204.
- National Science Foundation I-Corp. 2016-2017. \$50,000.00. Quorum sensing by bacteria on hosts regulates vector attraction and blood-feeding. Award number: 1643346.
- Texas A&M AgriLife Research Insect Vector Disease Program. 2016-2018. \$50,000.00. Mosquito Response to Volatile Organic Compounds associated with quorum sensing pathways.
- Texas Invasive Ant Research and Management Seed Grant Program. 2017-2019. \$94,575.00. Deciphering interkingdom communication between bacteria and red imported fire ants to develop novel bait attractants and ant repellants. Co-authored with Dr. Robert Puckett, Department of Entomology, Texas A&M University.
- National Science Foundation Industry/University Collaborative Research Center. 2015-2016. \$14,494.00. Collaborative: Planning Grants: Necrobiome Research and its application in decomposition ecology and forensics. Co-authored with Dr. Aaron Tarone, Department of Entomology, Texas A&M University. Award number: 1539947.
- Texas Invasive Ant Research and Management Seed Grant Program. 2013-2015. \$118,500.00. Deciphering interkingdom communication between bacteria and red

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- imported fire ants to develop novel bait attractants and ant repellants. Co-authored with Dr. Aaron Tarone, Department of Entomology, Texas A&M University.
- National Institute of Justice. 2010-2013. Development and validation of standard operating procedures for measuring microbial populations for estimating a postmortem interval. \$476,348.00. Co-authored with Dr. Aaron Tarone, Department of Entomology, Texas A&M University, College Station, Texas; Dr. Eric Benbow, University of Dayton, Dayton, Ohio; Dr. Tawni Crippen, USDA-ARS, College Station, Texas. Award number: 2010-DN-BX-K243.
- USDA: Western Region SARE. 2006. Black soldier fly larvae as a tool for managing animal waste and providing a food source for aquaculture industries. \$117,682.00. Co-authored with Dr. (PI) S. St. Hilaire, University of Idaho; Dr. C. Sheppard, University of Georgia; Drs. R. Sheffield, R. Hardy, W. Sealy, G. Fornshell, University of Idaho.
- USDA: Southern Region IPM Center. 2006-2007. Development of the elementary entomology extension program. \$18,134.00. Co-authored with Drs. P. Porter and M. Merchant, Ms. K. Engler, and M. Keck, Texas A&M University.
- Texas Imported Fire Ant Management and Research Program. 2005-2006. Year Two: Fire ant suppression of house flies associated with dairy manure. \$5,000.00.
- USDA: Southern Region IPM Grant. 2005-2007. Mosquito abatement in Texas: Monitoring insecticide resistance. \$35,169.00. Co-authored with Drs. J. Olson and P. Pietrantonio, Texas A&M University and Drs. R. Parsons and B. Gorena, Harris County Mosquito Control.
- USDA: Cooperative State Research Education and Extension Service: National Integrated Water Quality Program. Program Area 110.D. 2005-2008. Strategies for phosphorus reduction and subsequent reduced phosphorus runoff from land receiving dairy manure on the north Bosque and Leon rivers. \$582,478.00. Co-authored with Drs. (PI) J. Muir, T. Butler, and S. Mukhtar, Texas A&M University, and Drs. B. Lambert, D. Weindorf, and M. Yu, Tarleton State University. 2004-51130-02237.
- Texas Imported Fire Ant Management and Research Program. 2004-2005. Fire ant suppression of house flies associated with dairy manure. \$5,000.00.
- U.S. Poultry & Egg Association. 2000-2001. Characterization of behavioral response of gravid house fly, *Musca domestica* L., females to odors released by black soldier fly, *Hermetia illucens* (L.), larvae. \$10,005.00. Co-authored with Dr. D.C. Sheppard, University of Georgia.

PROPOSALS FUNDED THROUGH INTERNAL GRANTS (\$168,072.21)

- Texas A&M Triads for Transformation. 2019-2020. \$36,473.00. Co-authored with Drs. Aaron M. Tarone (PI) and Cliff Spiegelman.
- Texas AgriLife Research Genomics Seed Grant Program. 2014. \$22,866.00. Characterizing the functional dynamics between microbial wound communities and the biodebridement species, *Lucilia sericata*, to improve wound healing. Co-authored with Dr. Aaron M. Tarone.
- Whole Systems Genomics Initiative Traineeship. 2013. \$11,002.75. Assistance for Ms. Meghan Pimsler. Texas A&M University.
- Neuhaus-Shepardson Faculty Development Grant. 2012. \$2,000.00. Texas A&M University. Declined.

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- Whole Systems Genomics Initiative Traineeship. 2010. \$7,125.00. Texas A&M University. Assistance for Ms. Jennifer Pechal. Texas A&M University.
- Internal Reinvestment. 2009. Percival Growth Chambers. \$18,906.25. Department of Entomology, Texas A&M University. Co-authored with Drs. Aaron Tarone (PI) and Spencer Behmer.
- International Research Travel Assistance Grant. 2009. Supported travel to Thailand and China to examine microbe-insect interactions on ephemeral resources. \$1,500.00. Texas A&M University International Center, Texas A&M University.
- Internal Reinvestment. 2009. Mass Spectrometer. \$10,000.00. Department of Entomology, Texas A&M University. Co-authored with Drs. Tanya Pankiw (PI), Julio Bernal, Carlos Bogran, Micky Eubanks, Marvin Harris, Raul Medina, Albert Mulenga, Pete Teel, and Kyan Zhu-Salzman.
- Student Recruitment Travel Grant. 2009. Funds to bring a potential PhD student to visit the Department of Entomology. \$500.00. College of Agriculture and Life Sciences, Texas A&M University.
- Internal Reinvestment. 2008. Biological safety cabinet for microbial research. \$6,596.00. Department of Entomology, Texas A&M University.
- InsecTeams. 2006. Identification of genus specific proteins to discriminate between first instar calliphorid and sarcophagid larvae. \$2,951.73. Co-authored with Dr. A. Mulenga, Department of Entomology, Texas A&M University.
- Texas Cooperative Extension Entomology Supplemental Grant. 2005. Development of a mosquito booklet for primary education. \$3,350.00. Department of Entomology, Texas A&M University. Co-authored with Ms. Kim Engler.
- FY'05 Support for Research Equipment and Facilities Upgrades. 2004. LECO TrueSpec Macro C/H/N Analyzer. \$43,260.00. Co-authored with Drs. (PI) D. Weindorf, B. Lambert, Tarelton State University; and F. Mitchell and J. Muir, Texas Agriculture Experiment Station.
- Graduate Student Travel Grant. 2000. University of Georgia. \$550.00.
- Graduate Student Organization Travel Grant. 1997. University of Hawaii at Manoa, \$500.00.
- W.C. Nettles Memorial Grant. 1994. Department of Entomology, Clemson University. \$492.00.

PROPOSALS FUNDED THROUGH INDUSTRY AND GIFTS (\$928,703.00)

- Austin Police Department & Texas Department of Public Safety, Austin, Texas. 2017. \$39,864. Extraction buffer, quantitation, and PCR/CE reagents provided for the Forensic & Investigative Sciences Program.
- Syngenta Corporation. 2016. \$10,000.00. Evaluation of fly baits.
- Syngenta Corporation. 2015. \$5,600.00. Evaluation of fly baits.
- Mars Corporation. 2015. \$10,143.00. Toxicity of naturally occurring aflatoxin B1 and breakdown products on *Drosophila* larvae. Co-authored with Dr. Jonathan Cammack (PI), Texas A&M University.
- Austin Police Department, Austin, Texas. 2015. \$17,544.00. Extraction buffer, quantitation, and PCR/CE reagents provided for the Forensic & Investigative Sciences Program.
- Mars Corporation. 2015. Development of a harvester for black soldier fly larvae of optimal nutritional value. Co-authored with Dr. Jonathan Cammack (PI), Texas A&M University. \$81,484.00.

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- Mars Corporation: New Frontiers in Research. 2015. Fatty acid retention by black soldier fly larvae. Co-authored with Dr. Jonathan Cammack, Texas A&M University. \$55,782.00.
- Mars Corporation: New Frontiers in Research. 2014. \$530,466.00. Utilizing the black soldier fly to produce feedstuff for animals and livestock in the 21st century. Co-authored with Robert Olivier, Protaculture, Inc.
- Syngenta Corporation. 2013. \$17,250.00. Evaluation of baits for house flies.
- FMC Corporation. 2010. \$7,500.00. Number compounds examined for suppressing blow flies on concrete.
- Chemtura Corporation. 2008. \$10,000.00. Diflubenzeron for suppressing house fly and stable fly populations.
- BASF Corporation. 2008. \$10,000.00. Development of new bait for suppressing house flies in confined animal facilities.
- Chemtura Corporation. 2007. \$6,000.00. Using diflubenzeron to suppress house flies in dairy cattle manure.
- FMC Corporation. 2007. \$16,020.00. Development of novel insecticides for house fly suppression in confined animal facilities.
- Whitmire Micro-Gen. 2007. \$8,050.00. Insecticide resistance in resident house fly and litter beetle populations.
- Chemtura Corporation. 2006. \$9,500.00. Using diflubenzeron to suppress mosquito populations.
- FMG Corporation. 2006. \$7,500.00. Evaluation of Rabon for the suppression of horn flies, while not affecting dung beetle populations.
- Chemtura Corporation. 2006. \$11,500.00. Using Dimilin to suppress horn fly, stable fly and house fly populations associated with cattle wastes.
- Elanco Corporation. 2006. \$11,750.00. Spinosad for the suppression of house fly and darkling beetle populations associated with livestock facilities.
- FMC Corporation. 2006. \$10,750.00. Insecticide resistance in house fly and darkling beetle populations associated with livestock facilities.
- BASF Corporation. 2005. \$5,600.00. New chemical for controlling house flies.
- Chemtura Corporation. 2005. \$25,500.00. Dimilin used for suppressing house fly, horn fly, and stable fly populations in livestock facilities.
- FMC Corporation. 2005. \$15,800.00. Examination of insecticide resistance in fly populations located in confined animal and food-production facilities.
- Bayer Corporation. 2004. \$500.00. Using ear tags to reduce horn fly numbers on beef cattle.
- Chemtura Corporation. 2004. \$2,000.00. Dimilin as a means to reduce horn fly numbers on beef cattle.
- AMVAC Corporation. 2004. \$2,600.00. Ecozin 3% EC for suppressing house fly larval numbers in dairy manure.

STUDENT GRANTS, AWARDS, & FELLOWSHIPS (\$536,102.59 received)

Undergraduate Students

- Abby Jones. 2018. Ecological Integration Symposium. 2nd place Undergraduate Student Presentation Award. Texas A&M University.

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- Alex Gordy. 2015. \$500.00. Seeding Undergraduate Student Research: NSF Louis Stokes Alliance for Minority Participation.
- Adrianna Tirloni. 2015. \$1,000.00. Seeding Undergraduate Student Research: NSF Louis Stokes Alliance for Minority Participation.
- Dell, Z. 2015. Applications of near-infrared reflectance spectroscopy to estimate post mortem interval. 2nd Place, poster competition. Undergraduate Research Week, Texas A&M University. College Station, Texas.
- Rhinesmith, J. 2012. Quorum sensing by *Escherichia coli* serves as interkingdom signal with *Lucilia sericata* (Diptera: Calliphoridae). 1st place, non-PhD student. 10th Annual North American Forensic Entomology Conference, Las Vegas, Nevada.
- Diaz, M. 2011. Pupal size throughout dispersal of the secondary screwworm, *Cochliomyia macellaria* (Diptera: Calliphoridae): implications for forensic entomology. 1st place, non-PhD student. 9th Annual North American Forensic Entomology Conference, College Station, Texas.
- Littlefield, K. 2007. Condensed tannins reduce house fly populations in dairy manure. 3rd place undergraduate poster presentation. Texas A&M University AgriLIFE Conference. College Station, Texas.
- Littlefield, K. 2007. Condensed tannins reduced house fly populations in dairy manure. 1st place poster presentation. Undergraduate Agriculture Division, 5th Annual Student Research Symposium: Pathways to the Doctorate. Tarleton State University, Stephenville, Texas.
- Myers, H. 2004. Texas Chapter: American Society of Agronomy. Excellence in research award for undergraduates.

MS Students

- Owings, C.G. 2012. \$300.00. Donald E. Johnston Fellowship. Acarology Summer Program, Ohio State University.
- Owings, C.G. 2012. \$250.00. Mites and Forensics: Linking Acarology to Decomposition Ecology. American Arachnological Society Grant.
- Owings, C.G. 2012. Outstanding Forensic Graduate Teaching Assistant. Department of Entomology, Texas A&M University.
- Owings, C.G. 2011. Outstanding Entomology Graduate Teaching Assistant. Department of Entomology, Texas A&M University.
- Owings, C.G. 2011. \$500.00. Bush Travel Grant, Department of Entomology, Texas A&M University.
- Fonseca, A. 2011. \$6,731.80. Insect-Microbe Interactions. CONACYT.
- Cammack, J. 2009. \$2,275.00. Carl and Ruby Nettles Entomology Student Travel Fund, Clemson University, Clemson, South Carolina.
- Cammack, J. 2008. \$1,070.00. W. Carl Nettles and Ruby S. Nettles Memorial Endowment in Entomology, Clemson University, Clemson, South Carolina.
- Cammack, J. 2008. \$1,128.00. W. Carl Nettles and Ruby S. Nettles Memorial Endowment in Entomology, Clemson University, Clemson, South Carolina.
- Cammack, J. 2008. \$250.00. Travel Grant to the North American Forensic Entomology Conference. Graduate Student Government Professional Enrichment Grant, Clemson University, Clemson, South Carolina.

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- Cammack, J. 2008. \$2,000.00. Effects of the parasitoid *Nasonia vitripennis* (Hymenoptera: Pteromalidae) on pupation depth of the green bottle fly, *Lucilia sericata* (Diptera: Calliphoridae). Terminex Fellowship.
- McClellan, P. 2008. Graduate Division: 1st place poster presentation, Graduate Agriculture Division 6th Annual Pathways Student Research Symposium, Texas A&M System. Commerce, Texas.
- McClellan, P. 2007. 2nd place poster presentation. Graduate Agriculture Division, 5th Annual Student Research Symposium: Pathways to the Doctorate. Tarleton State University, Stephenville, Texas.
- Cammack, J. 2007. \$959.00. Effects of the parasitoid *Nasonia vitripennis* (Hymenoptera: Pteromalidae) on pupation depth of the green bottle fly, *Lucilia sericata* (Diptera: Calliphoridae). W.C. Nettles Endowed Grant.

PhD Students

- Rhinesmith-Caranza, J. 2020. President's Award for Academic Advising, Texas A&M University.
- Flint, C.A., and **J.K. Tomberlin**. 2020. Small but Mighty: Microbes influencing decomposition and attraction of the blow fly, *Cochliomyia macellaria*. 1st Place Ph.D. Platform Presentation: Decomposition Symposium. Texas A&M University, Ecological Integration Symposium Annual Meeting, College Station, Texas.
- Kotze, Z. 2019. Mechanisms regulating behavior of invertebrate decomposers: Deciphering arthropod succession as related to forensic entomology. 1st place Outstanding PhD Presentation. Graduate Student Forum, Department of Entomology, Texas A&M University.
- Kotze, Z. 2019. Mechanisms regulating behavior of invertebrate decomposers: Deciphering arthropod succession as related to forensic entomology. 1st place Outstanding PhD Presentation. North American Forensic Entomology Association annual congress, Indianapolis, Indiana.
- Rhinesmith, J. 2019. Outstanding Teaching Assistant Award. Department of Entomology, Texas A&M University.
- Kotze, Z. 2018. Outstanding Teaching Assistant Award. Department of Entomology, Texas A&M University.
- Heo, C.C. 2017. J.H. Comstock Award, Southwestern Branch: Entomological Society of America.
- Heo, C.C. 2016. Perdana Scholar Award in Research, Innovation, and Publications from the Malaysia Government. Washington, DC.
- Heo, C.C. 2015. Medical, Urban, and Veterinary Entomology Scholarship, Entomological Society of America.
- Heo, C.C. 2015. 1st Place Oral Presentation. Graduate Student Forum, Department of Entomology, Texas A&M University.
- Heo, C.C. 2015. Sigma Xi Interdisciplinary Award. Texas A&M University.
- Heo, C.C. 2015. Vice President for Research Excellence. Texas A&M University.
- Heo, C.C. 2015. 1st Place, Graduate Student Oral Presentation. Student Research Week, Texas A&M University.
- Pimsler, M.L. 2015. J.H. Comstock Award, Southwestern Branch: Entomological Society of America.

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- Pimsler, M.L. 2015. Outstanding Graduate Student, PhD. Department of Entomology, Texas A&M University.
- Pimsler, M.L. 2014. Medical, Urban, and Veterinary Entomology Scholarship, Entomological Society of America.
- Pimsler, M.L. 2014. \$36,700.00. Texas A&M University Dissertation Fellowship.
- Lindgren, N. 2013. \$81,000.00. Diversity Fellowship, Texas A&M University.
- Pimsler, M.L. 2013. Outstanding PhD student presentation. North American Forensic Entomology Association Conference, Dayton Ohio.
- Pimsler, M.L. 2013. Outstanding Graduate Student, PhD. Department of Entomology, Texas A&M University.
- Pimsler, M.L. 2012. Elucidation of the genetic basis of monogeny in *Chrysomya rufifacies* (Diptera: Calliphoridae). 2nd Place, President's prize for oral presentation. National Entomological Society of America Conference. Knoxville, Tennessee.
- Pechal, J. 2011. Medical, Urban, Veterinary Entomology Section, Entomology Society of America. Travel Grant to International Congress of Entomology in Korea 2012.
- Pimsler, M. 2011. Bacteria regulate attraction and colonization of a resource by the black soldier fly (Diptera: Stratiomyidae). Outstanding PhD student oral presentation. North American Forensic Entomology Conference, College Station, Texas.
- Brundage, A. 2011. Knipling-Bushland Fellowship, Department of Entomology, Texas A&M University.
- Brundage, A. 2011. Effects of temporal priority on interactions between *Cochliomyia macellaria* (Diptera: Calliphoridae) and *Chrysomya rufifacies* (Diptera: Calliphoridae) larvae on a carrion resource. 2nd place, Outstanding PhD student presentation. North American Forensic Entomology Conference, College Station, Texas.
- Flores, M. 2010&2011. Outstanding Graduate Teaching Assistant. Department of Entomology, Texas A&M University.
- Liu, W. 2010. \$180,808.00. China Scholarship Council. People's Republic of China.
- Flores, M. 2010. \$5,000.00. Benedict Memorial Fellowship. Department of Entomology, Texas A&M University.
- Pimsler, M. 2010. \$70,000.00. Diversity & Reagents Fellowships, Texas A&M University.
- Sanford, M. 2010. Association of Former Students Outstanding Graduate Student Award. Texas A&M University.
- Brundage, A. 2010. Outstanding Graduate Student, PhD Department of Entomology, Texas A&M University.
- Brundage, A. 2009. Vice-Chancellor Award for Graduate Student Teaching. College of Agriculture and Life Sciences, Texas A&M University.
- Núñez, C. 2009. \$13,800.00. Microbe-insect interactions. CONACYT. Mexico.
- Zhu, L. 2009. \$12,600.00. China Scholarship Council, People's Republic of China.
- Pechal, J. 2009. \$250.00. Office of Graduate Studies Travel Grant. Texas A&M University.
- Flores, M. 2009. \$6,934.05. Bridging Assistantship. College of Agriculture and Life Sciences, Texas A&M University.
- Brundage, A. 2009. \$5,000.00. Benedict Memorial Fellowship. Department of Entomology, Texas A&M University.

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- Denemark, E. 2009. \$70,000.00. Diversity & Reagents Fellowships. Texas A&M University.
- Brundage, A. 2009. \$1,000.00. Susan M. Arseven '75 Make-A-Difference Memorial Award. Texas A&M University.
- Sanford, M. 2009. J.H. Comstock Outstanding PhD Student. Southwestern Branch: Entomological Society of America.
- Sanford, M. 2009. Outstanding Graduate Student, PhD Department of Entomology, Texas A&M University.
- Sanford, M. 2008. Outstanding Presentation Award. Royal Golden Jubilee Seminar. Chiang Mai University, Chiang Mai, Thailand.
- Sanford, M. 2007. \$12,058.74. Fulbright Fellowship to Thailand. The only Fulbright awarded to a Texas A&M University student during
- Sanford, M. 2007. 3rd place, student presentation competition. Southwestern Branch: Entomological Society of America. Corpus Cristi, Texas.
- Sanford, M. 2005. James Gus Foyle Memorial Scholarship, Texas Mosquito Control Association.
- Sanford, M. 2005. \$19,000.00. Regents Fellowship, Texas A&M University.

Professional Students

- Littlefield, K. 2010. \$4,888.00. College of Veterinary Medicine and by awards from the Texas Veterinary Medical Foundation, the National Institutes of Health, the Merck-Merial Veterinary Scholars Program, and the William & Dorothy Klemm Fellowship. Texas A&M University.

PROFESSIONAL EXPERIENCE

Granting Reviewer

- NP 104 Panel 3, USDA Project Review. 2019.
- EUREKA Online Peer Panel. 2019.
- Austrian Science Funds. 2019.
- Reviewed PhD Forensic Science Program, Oklahoma State University. 2018.
- X-Grants, Texas A&M University. 2018.
- National Oceanic Atmospheric Administration. 2017.
- USDA, SBIR. 2017, 2018.
- Environmental Research and Education Foundation, Raleigh, North Carolina. 2015.
- Netherlands Organisation for Scientific Research, Netherlands. 2014.
- Enhancement Research Grant, Sam Houston State University, Huntsville, Texas. 2013.
- Austrian Science Fund. 2012.
- South African Medical Research Council. 2011.
- National Science Foundation. 2010, 2012.
- Joint Action Research. 2010. French Community of Belgium, Université de Liège, Liège, Belgium.
- International Foundation for Science. 2008. Proposal AB/19595.
- Southern Region SARE Sustainable Agriculture Research and Education. 2007. Proposals FP08-14, FP08-27.
- Louisiana Board of Regents. 2006.
- Ontario Research Fund. Ministry of Research and Development. 2005, 2007.

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- General Forensic Research and Development Panel. National Institute of Justice. Washington, D.C. 2005.
- USDA Formula Animal Health Grant Review Panel. Texas A&M University. 2005.
- United States Civilian Research and Development Foundation. 2004-2005.
- Natural Sciences and Engineering Research Council of Canada. 2004.
- National Research Initiative. 2004.
- National Institute of Justice. 2002, 2004, 2005, 2012.

Journal Affiliation

- Manuscript reviewer: Nature Communications, Ecology Letters, F1000, Plos One, International Journal of Legal Medicine, Pakistan Journal of Scientific & Industrial Research, Journal of Vector Ecology, Journal of Forensic Identification, Canadian Journal of Forensic Sciences, Journal of Forensic Identification, Journal of Applied Entomology, Entomologia Experimentalis et Applicata, Journal of Forensic Sciences, American Society of Biological and Agricultural Engineers, Forensic Science International, Journal of Ethology, Journal of Agricultural and Urban Entomology, Entomological News. Journal of Economic Entomology, Tropical Biomedicine, Southwestern Entomologist, Naturwissenschaften, Journal of Medical Entomology, Environmental Entomology, Journal of Insect Behavior, Journal of Hazardous Materials, and Annals of the Entomological Society of America.
- Editorial Board. Insects. 2019-present.
- Associate Editor. Journal of Insects as Food and Feed. 2016-present.
- Subject editor, integrated pest management, Annals of the Entomological Society of America. 2004-2010. Annals Editorial Board, 2007-2010, chair 2009-2010.
- Co-editor, Tymbal: University of Georgia Internet Information Page. 1998-1999.
- Editor's assistant, Proceedings of the Hawaiian Entomological Society. 1996-1997.

Faculty Affiliation

- Affiliate Faculty, Department of Horticulture and Landscape Architecture, Colorado State University. 2019-present.
- Co-Director, 2018-2020, Director, 2017-2018, Affiliate Site, NSF-NIJ Center for Advanced Research in Forensic Science.
- Director, 2016-2020. Associate Director. 2014-2015. Forensic & Investigative Sciences Program, Department of Entomology, Texas A&M University.
- Internship and Research Coordinator. 2012-2015. Department of Entomology, Texas A&M University.
- Graduate Faculty, The University of Texas- Pan American. 2014-present.
- Associate reader, Forensic Sciences Program, University of Lincoln. 2013-present.
- Adjunct professor, Department of Entomology, Rutgers University. 2010-present.
- Adjunct professor, Department of Biology, Windsor University. 2009-present.
- Adjunct professor, Department of Entomology, Soil, and Plant Pathology, Clemson University. 2007-present.
- Adjunct professor, Department of Anthropology, Texas State University. 2006-present.
- Full member, Graduate Faculty: Texas A&M University. 2007-present.
- Associate member, Graduate Faculty: Texas A&M University. 2005-2007.
- Adjunct professor, Tarleton State University. 2003-present.
- Adjunct professor, Abraham Baldwin College. 2000-2002.

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-Certified instructor, Georgia Peace Officer Academy. 2000-2002.

Courses Taught

- Forensic Entomology, FIVS/ENTO 431/432. Department of Entomology, Texas A&M University, Spring 2020.
- Insects and Society, ENTO 322. Department of Entomology, Texas A&M University, Fall 2016.
- Forensic Sciences Seminar, FIVS 481. Department of Entomology, Texas A&M University. Spring 2009-present.
- Science and Law, FIVS 415. Department of Entomology, Texas A&M University. Spring 2008-present.
- An Introduction to the Forensic and Investigative Sciences, FISC 205. Department of Entomology, Texas A&M University. Fall 2007-2013.
- Extension Entomology, ENTO 691, Department of Entomology, Texas A&M University. Fall 2005.
- Forensic Entomology, AGRI 4903/5903-CJ4853/5153. Tarleton State University. Fall 2004, Fall 2006.
- Anatomy & Physiology, BIOL 2011 and Biol2011L. Abraham Baldwin Agricultural College. Fall 2002.
- Introduction to Biology, BIOL 2107 and Biol2107L, Abraham Baldwin Agricultural College. Fall 2000.
- Forensic Entomology, Georgia Peace Officer Standards and Training Council. 2000-2002.
- Forensic Sciences, Continuing Education Program, University of Georgia. Spring 2000.

Certification

- Graduate Teaching Academy Mentor. 2008-present.
- Bloodstain pattern analyst. 2008.
- Diplomate, American Board of Forensic Entomology. 2005-present.
- Licensed South Carolina and Georgia commercial pesticides applicator. 1995-1996.

COMMITTEE SERVICE

University

- Committee on Utilization and Assignment of Physical Space. 2020-2022. Department of Entomology, Texas A&M University.
- Acarology faculty search committee, chair. 2017. Department of Entomology, Texas A&M University.
- Chemical ecology faculty search committee. 2016. Department of Entomology, Texas A&M University.
- Forensic & Investigative Sciences Program Student Mentoring. Advisor, 2016-present. Department of Entomology, Texas A&M University.
- Subcommittee to Review Contract Negotiations Role and Responsibilities. 2015. Sponsored Research Services, Texas A&M University.
- Graduate Admissions Committee. 2013-2015. Department of Entomology, Texas A&M University.
- Undergraduate Programs Councils. 2011-2015. College of Agriculture and Life Sciences, Texas A&M University.

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- Department of Entomology Chairperson Search Committee 2009. Department of Entomology, Texas A&M University.
- Ad hoc* Academic Advisor Search Committee. 2009. Department of Entomology, Texas A&M University.
- Academic Advising Committee. 2010-present. Department of Entomology, Texas A&M University.
- Education Committee. 2008-2012, 2015-2018. Department of Entomology, Texas A&M University. Secretary, 2010; Chair, 2011.
- Student Enhancement Funds Committee. 2010-2012. Department of Entomology, Texas A&M University.
- Aggie Forensic & Investigative Sciences Club. Co-advisor, 2007-2012. Department of Entomology, Texas A&M University.
- Molecular forensic sciences faculty position committee, co-chairperson. 2007-2008. Department of Entomology, Texas A&M University.
- Ad hoc* Academic Advisor Search Committee. 2008. Department of Entomology, Texas A&M University.
- Award and Scholarships Committee. 2008-2009. Department of Entomology, Texas A&M University.
- Graduate Student Recruitment Committee. 2008-2011. Department of Entomology, Texas A&M University.
- Faculty Advisory Committee. 2008-2011; 2013-2016; 2019-2022; Secretary, 2009-2010, Chair 2019-2022. Department of Entomology, Texas A&M University.
- Texas State University Anatomical Oversight Review Committee (TSAORC). 2007-2011. Department of Anthropology, Texas State University.
- Texas Cooperative Extension emergency management incident resource teams: food, fiber, and forestry committee. 2007. Texas A&M University.
- Ad hoc Committee for the development of faculty replacement position for Dr. Cognato. 2005-2006. Department of Entomology, Texas A&M University.
- Center for grasslands and ranch management committee. 2005-2007. Texas A&M University.
- Arthropod vectored diseases faculty position committee: Development of initiative for Texas legislature. 2004. Texas Agricultural Experiment Station, Texas A&M University.
- Planning committee. 2004. Blackland Income Growth Summer Agriculture Tour of Georgia. Texas Cooperative Extension, Texas A&M University.
- Search committee for vector entomologist assistant professorship. 2004. Department of Entomology, Texas A&M University.
- Forensic sciences panel. 2000. Department of Biology, University of Georgia.
- Alumni relations committee. 1999-2000. College of Agriculture and Environmental Sciences, University of Georgia.
- Travel grants selection committee. 1998. Graduate Student Organization, University of Hawaii at Manoa.
- Ka Puhana (Mentor) award selection committee. 1998. College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa.
- Curriculum committee. 1997-1998. Department of Entomology, University of Hawaii at Manoa.

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-Ka Mea Kolo outreach program committee. 1996-1997. Department of Entomology, University of Hawaii at Manoa. Chairperson 1997.

Professional

- The Organization of Scientific Area Committees for Forensic Science: Crime Scene/Death Investigation Scientific Area Committee (CS/DI SAC). 2019-present.
- Crime Scene/Death Investigation Scientific Area Committee (CS/DI SAC): Forensic Entomology Task Group. 2019-present.
- Certified technical assessor, ANSI National Accreditation Board. 2019-present.
- Moderator (2X). 2018. Entomological Society of America, Vancouver, Canada.
- Conference organizing committee. 2018. Insects Feed World Conference, Wuhan, China.
- Moderator, plenary session. 2018. Insects Feed World Conference, Wuhan, China.
- Co-organizer Insects Feed the World Conference, Wuhan, China.
- Moderator, Forensic microbiology session. 2018. American Academy of Forensic Sciences, Seattle, Washington.
- Research for Insects as Feed, North American Coalition for Insect Agriculture. 2016-2019. Board of Directors 2018-2019.
- American Academy of Forensic Sciences Executive Committee: Policy & Procedures Committee. American Academy of Forensic Sciences. 2016-2021.
- Pathology/Biology Section, AAFS Academy Cup, American Academy of Forensic Sciences. 2014-2015.
- National Commission on Forensic Science, Scientific Research and Inquiry Subcommittee. 2014-2017.
- Forensic Sciences Foundation's Career Booklet Committee. 2014. American Academy of Forensic Sciences.
- Forensic Education Programs Accreditation Commission. 2014-2020. American Academy of Forensic Sciences.
- Awards Committee, 2012-2015. Pathology/Biology Section, American Academy of Forensic Sciences.
- Forensic Entomology Search Committee, Harris County Institute of Forensic Sciences, Houston, Texas. 2012.
- International Advisory Committee. 2010-2011. Global Conference on Entomology. Chiang Mai, Thailand.
- Ad Hoc Committee on Recruitment and Retention of Forensic Biologists in Pathology/Biology Section. 2010-2012. Pathology/Biology Section, American Academy of Forensic Sciences.
- Research Grants Committee. 2010-2012. Pathology/Biology Section, American Academy of Forensic Sciences.
- Awards Committee. 2008-2010. Southwestern Branch: Entomological Society of America.
- Entomological Foundation Board of Counselors. 2007-2010. The Entomological Foundation, Lanham, Maryland.
- Pathology/Biology Section Program Chairperson. 2008-2009. American Academy of Forensic Sciences.
- Education Committee. 2007-2010. American Academy of Forensic Sciences.
- Lifetime Achievement Award Committee. 2007-2010. Chair 2007-2008. Pathology/Biology Section, American Academy of Forensic Sciences.

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- Examination committee. 2006-2007. American Board of Forensic Entomology. Chairperson 2006-present.
- Membership committee. 2006-2009. Southwestern Branch: Entomological Society of America.
- Livestock insect workers conference lifetime achievement award committee. 2005-2008. extension representative.
- Livestock insect workers conference advisory committee. 2005-2007. Extension representative.
- Student presentation judging committee. 2004. National: Entomological Society of America. Salt Lake City, Utah.
- Thomas Say awards committee. 2004-2005. National: Entomological Society of America. Salt Lake City, Utah.
- Constitution and by-laws committee. 2004-2005. Co-founder and chair. North American Forensic Entomology Association.
- Editorial committee, Annals of the Entomological Society of America. 2004-2009. Representative of Section D, Entomological Society of America.
- Student awards committee. 2004-2006. Southwestern Branch: Entomological Society of America. Lubbock, Texas.
- Program committee, Co-chair. 2003-2005. North American Forensic Entomology Conference. Davis, California.
- Conference organizing committee. 2003. Initiated and developed first forensic entomology conference in North America. Las Vegas, Nevada.
- Medical-veterinary entomology section moderator. 2003. National: Entomological Society of America. Cincinnati, Ohio.
- Symposium organizer. 2001. Forensic Entomology. Southeastern Branch: Entomological Society of America, Augusta, Georgia.
- Student affairs committee. 2000. Georgia Entomological Society.
- Sigma Xi membership committee. 2000. Tifton Chapter, Tifton, Georgia.
- O.I. Snapp awards committee. 2000. Georgia Entomological Society.
- National student affairs committee. 1999-2000. Entomological Society of America. Vice-chairperson 1999, Chairperson 2000.
- Membership committee. 1995-1996. South Carolina Entomological Society.

PROFESSIONAL MEMBERSHIP

- American Association for the Advancement of Science. 2018-present.
- American Board of Forensic Entomology. 2005-present. Examination Committee, 2005-2006, 2009-2012. Secretary, 2011-2013, Vice-Chair, 2013-2015, Chair 2015-2017, Past-Chair, 2017-2019.
- North American Forensic Entomology Association. 2005-present. President, 2005-2006, Past-president 2006-2007. Annual conference host, 2003 and 2011.
- European Association of Forensic Entomology. 2003-present.
- American Academy of Forensic Sciences. 1996-present. Associate Member 1996-2002, Member 2003-2006, Fellow 2007-present. Program Chairperson, Pathology/Biology Section 2008-2009. Secretary, Pathology/Biology Section 2010-2011.
- Entomological Society of America. 1994-present.

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- Sigma Xi, Scientific Honor Society. Associate member, 1996-present; Full Member 2008-2011.
- Texas Chapter: American Society of Agronomy. 2004-2005.
- Hawaiian Entomological Society. 1996-1998.
- South Carolina Entomological Society. 1994-1996.

INTERNATIONAL TRAVEL

- China: 22 July-4 August, 2019. Visited three universities, including the Chinese Academy of Sciences in Shanghai, to discuss collaborations on black soldier fly research.
- Algeria: 6-12 April, 2019. ANAB review of the Algerian Gendarmerie Institut National de Criministique et de Criminologie (INCC) Forensic Laboratory.
- Chile: 14-17 October, 2018. I presented on black soldier fly research at a pre-meeting held in conjunction with Aqua Sur Conference.
- Switzerland/Netherlands: 22-29 September, 2018. I presented on black soldier fly research at EAWAG, ETH, and Wageningen University.
- Malawi: 15-21 July 2018. I attend the Farming Insects as Feed: Next Generation of Food Security in Malawi Symposium. Lilongwe University of Agriculture and Natural Resources (LUANAR). Lilongwe, Malawi.
- Ecuador: 24-29 July 2018. I visited a banana company interested in developing sustainable production of the black soldier fly. Guayaquil, Ecuador.
- Peru: 28 May-1 June 2018. I attending a conference on black soldier fly production. Universidad Catholica de Santa María. Arequipa, Peru.
- China: 8 May-19 May 2018. I co-organized Insects Feed the World conference as well as provided lectures on critical thinking. Huazhong Agricultural University in Wuhan.
- China: 3 September-17 September 2017. I provided lectures on critical thinking as well as attended a conference (and presented) on insects as food and feed. Huazhong Agricultural University in Wuhan.
- India: 30 November-9 December 2016. I attended an entomology conference and presented forensic entomology research. I also met with potential collaborators with regards to forensic entomology and black soldier fly.
- Australia: 19-24 October 2016. I met with potential industry partners and evaluated mass production of black soldier fly larvae from food waste.
- China: 8-19 October 2016. I was invited to give a presentation on the black soldier fly as a means to reduce food waste. This presentation was given at a conference. I also met with potential industry partners in several cities.
- South Africa: 5-9 September 2015. My purpose was to visit AgriProtein, Inc. I discussed proper colony maintenance and production of the black soldier fly.
- United Kingdom: 1 August-1 December 2015. My purpose was to complete a faculty development leave within the laboratory of Dr. Rebecca Kilner in the Department of Zoology, University of Cambridge.
- Italy: 20-28 September 2014. My purpose was to give an invited presentation at the workshop entitled, "Corso di Perfezionamento in Anthropologia e Odontologia Forense l'Identificazione," held in Naples, Italy, The workshop was sponsored through the Dipartimento di Medicina Clinica e Sperimentale Uiniversita Degli Studi di Foggia.

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- China: 1-15 June 2014. My purpose was to meet with colleagues at the following institutions to discuss research opportunities associated with alternate protein production and waste management. College of Agricultural and Biotechnology, Zhejiang University in Huangzhou, State key Laboratory of Agricultural Microbiology, Huazhong Agricultural University in Wuhan, Northwest Agricultural and Forestry University in Xian, College of Plant Protection, Shandong Agricultural University in Jinan, and China Agricultural University in Beijing.
- Portugal: 19-28 May 2014. I attended the Forensic Sciences and Criminal Behaviour Conference, Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal. I also gave a workshop on forensic entomology and a second workshop on forensic microbiology.
- Italy: 7-20 September 2013. I participated in a weeklong workshop on forensic sciences. University of Pavia, Italy.
- Brazil: 21- 27 July 2013. I gave an invited presentation and taught a two-day workshop on forensic entomology. UNICAMP, Universidade Estadual de Campinas, São Paulo, Brazil.
- United Kingdom and Portugal: 16-26 May 2013. I travel to meet with researchers at the University of Lincoln and discuss potential programmatic collaborations for graduate student training. I also attended the Forensic Sciences and Criminal Behaviour Conference, Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal.
- United Kingdom: 3-20 January 2013. I taught a course on forensic entomology as part of the Erasmus Mundus MS program in forensic science at the University of Lincoln. I also gave presentations at the London School of Tropical Medicine and Hygiene and at Charterhouse in Godalming, United Kingdom.
- Brazil: 30 September-6 October 2012. I attended the 3rd annual Simposio de Entomologia Aplicada in Recife, Brazil. The conference was held at the Universidade Federal Rural de Pernambuco.
- Malaysia: 30 June-11 July 2011. I visited Universiti Teknologi Mara, Kulua Lumpur. I gave two invited presentations on decomposition ecology and its relationship to forensics and human health.
- China: 23-30 June. 2011. Huazhong Agricultural University, Guangzhou Police College. I gave invited presentations decomposition ecology and its relationship to forensics and human health at both universities.
- Thailand: 13-26 June 2010. Ubon Rachitoni University. I conducted field research examining the attraction of blow flies to sterile and non-sterile liver. I also gave a presentation on decomposition ecology and its application to forensics and human health.
- China: 16-23 June 2009. State Key Laboratory of Agricultural Microbiology, Huazhong Agricultural University, Wuhan, China. I visited Haiku and Wuhan, China where we examined interactions between black soldier fly larvae, *Hermetia illucens*, and microbes associated with swine wastes.
- Thailand: 8-16 June 2009. Chiang Mai University, Chiang Mai, Thailand. I conducted research on the interactions of bacteria and *Chrysomya rufifacies* in its native range.

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- Mexico: 20-25 October 2008. Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico. I was invited to give a forensic entomology presentation at the Senana Del Parasitologo XXV. I also gave two presentations at the first forensic entomology workshop to be conducted in Mexico. I also met with two PhD. students on whose committee I am serving.
- Mexico: 17-20 October 2007. Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico. I gave an invited lecture on forensic entomology during the Senana Del Parasitologo XXIV. I also met Santiago Vergara and Carolina Vasquez, PhD students, to discuss serving on their committees.
- Australia: 10-25 March 2007. University of Queensland, Brisbane Australia. I visited Mr. Trevor Lambkin to develop an international program on insecticide resistance in litter beetle populations associated with poultry facilities. I also gave an invited presentation on forensic entomology.
- China: 15-26 May 2006. State Key Laboratory of Agricultural Microbiology, Huazhong Agricultural University, Wuhan, China. We visited researchers to discuss sustainable agriculture and phosphorous recycling in confined animal facilities. I emphasized the use of the black soldier fly, *Hermetia illucens*, as a means to reduce manure accumulation and the production of pupae as feed for the aquaculture industry. I also gave an invited presentation on forensic entomology.
- Haiti: 20 March-1 April 2006. USAID: Partners of the Americas: Farmer to Farmer Program. I collaborated with individuals in Haiti on the development of rabbitries as a commodity for agricultural producers. I assisted with the development of integrated pest management and sustainable agriculture information for use by local extension agents and producers.

VISITING SCHOLARS

- Amely Bauer. 2019. MS student, University of Göttingen, Germany.
- Alex Bauer. 2019. MS student, University of Göttingen, Germany.
- Huang Yuan Zhang. 2018-2019. MS student, Huazhong Agricultural University, China.
- Francesco Defilippo. 2018. Faculty member. Istituto Zooprofilattico Sperimentale Lombardia ed Emilia-Romagna, Italy.
- Andrei Alyokhin. 2018. Faculty member, School of Biology & Ecology, University of Maine.
- Gabriel Bake. 2018. Fulbright faculty scholar, Federal University of Technology Minna, Minna, Nigeria.
- Cinthya Saldaña. 2018. Fulbright graduate student scholar, Emporia State University, Kansas via Colombia.
- Amely Bauer. 2018. Undergraduate, University of Goettingen, Germany.
- Juliana Santos de Oliveira. 2018. Visiting undergraduate, University of São Paulo, Brazil.
- Anika Sharma. 2017-2018. Fulbright graduate student scholar., Department of Zoology and Environmental Sciences, Punjabi University, India.
- Marco Meneguz. 2017. PhD student, University of Turin, Italy.
- Andrea Scala. 2017. PhD student, Department of Science, University of Basilicata, Italy.
- Justine Richard-Giroux. 2017. MS student, Université Laval, Canada.
- Moses Zimba. 2016. Fulbright Scholar, Department of Biological Sciences, University of Zimbabwe.

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- Heather Jordan. 2016. SEC Scholar. Department of Biology, Mississippi State University.
- Meltem Kökdener. 2015. Ondokuz Mayıs University, Atakum/Samsun, Turkey.
- Rodrigo Carrea. 2015. Federal University of Pernambuco, Recife, Brazil.
- Qing Li. 2015. Associate Professor, Huangzhou Agricultural University. Wuhan, China.
- Laura Harnden. 2015. MS student from Erasmus Mundus Program, European Union via New Zealand.
- Emmanuel Tettah. 2015. MS student from Erasmus Mundus Program, European Union via Ghana.
- Gabe Trissini. 2014. Visiting MS student from University of Pavia. Pavia, Italy.
- Inoka Karunaratne. 2014. Visiting Fulbright Fellow from University of Peradeniya, Sri Lanka
- Tayna Olimpia Farias da Silva. 2014. Decomposition ecology of two competing blow flies (Diptera: Calliphoridae). Universidade de Pernambuco, Brazil.
- Chantal Milani. 2014. Forensic anthropologist. Turin, Italy.
- Astri Wayadande. 2012. Assistant Professor, Entomology and Plant Pathology, Oklahoma State University. Big 12 Fellowship.
- Aline Spindola. 2011. B.S. student. Department of Agronomy, Universidade Federal Rural de Pernambuco, Brazil.
- Kelda Stagg. 2011. M.S. Forensic Sciences, Uppsala University, Sweden.
- Alicia Fonseca-Munoz. 2011. MS student. Instituto Politecnico Nacional University, Oaxaca, Mexico. Interactions between blow fly larvae and targeted bacteria species commonly occurring in ulcerated wounds.
- Kim Littlefield. 2010-2011. Veterinary medicine, first year. College of Veterinary Medicine, Texas A&M University. Effects of condensed tannins on biofilm formation.
- Carolina Nunez. 2009-2010. PhD student, Universidad Autonoma Agraria Antonio Narro, Saltillo, Mexico. Research: Effects of excretions/secretions on biofilm formation of *E. coli*.
- Longyu Zheng. 2009-2010. PhD student, Huazhong Agricultural University, Wuhan, China. Research: Identification of microbes associated with black soldier fly, *Hermetia illucens* (Diptera: Stratiomyidae) eggs and their role in regulating colonization of a resource by intraspecific females.
- Leslie Holmes. 2009-2010. MS student, Department of Biology, Windsor University, Canada. Research: Abiotic factors regulating development of the black soldier fly, *Hermetia illucens* (Diptera: Stratiomyidae).
- Qiaolin Liu. 2006-2007. MS student, Huazhong Agricultural University. Wuhan, China. Research: Interactions between *E. coli* and *Hermetia illucens* larvae in dairy manure.

POSTDOCTORAL ASSOCIATES

- Travis Rusch. 2017-present. Thermal tolerance of blow flies.
- Pablo Delclos. 2017-2019. Interkingdom interactions between bacteria and fungi.
- Rodrigo Carmo. 2015-2016. Life-history of *Dermestes maculatus*.
- Jonathan Cammack. 2014-2019. Impact of nutrition on microbial communities and development of arthropods associated with ephemeral resources.

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- Baneshwar Singh. 2010-2012. Assessment of microbial communities associated with vertebrate carrion.

GRADUATE STUDENTS

Non-thesis MS Students

- Eric Denemark. 2009-2010. Department of Entomology, Texas A&M University, College Station, Texas.

MS Students

- Alexandra Bauer. 2018-2019. Thesis: Impact of diet moisture on the development of the forensically important blow fly *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae). Georg-August-Universität Göttingen, Germany.
- Amely Bauer. 2019-2019. Thesis: Effects of photoperiod on the development of forensically important blow fly *Chrysomya rufifacies* (Macquart) (Diptera: Calliphoridae). Georg-August-Universität Göttingen, Germany.
- Jennifer Sweeney. 2015-2017. Thesis: Interkingdom interactions impact red imported fire ant foraging behavior. Department of Entomology, Texas A&M University. Co-advised with Dr. Robert Puckett, Department of Entomology, Texas A&M University.
- Abadi Mashlawi. 2015-2017. Thesis: Mycolactone impacts larval *Aedes aegypti* (Diptera: Culicidae) development and oviposition choice. Department of Entomology, Texas A&M University.
- Claire McKenna. 2014-2017. Thesis: Gene expression of larval *Lucilia sericata* (Diptera: Calliphoridae) exposed to microbes. Department of Entomology, Texas A&M University.
- Kelly Beskin. 2014-2016. Thesis: Volatile emissions from animal waste digested by the black soldier fly (Diptera: Stratiomyidae). Department of Entomology, Texas A&M University.
- Amanda Tinder. 2013-2016. Thesis: Bioconversion of sorghum and cowpea by black soldier fly (*Hermetia illucens*) larvae. Department of Entomology, Texas A&M University. Co-advised with Dr. Robert Puckett, Department of Entomology, Texas A&M University.
- Joshua Thomas. 2014-2015. Thesis: Development of *Megaselia scalaris* (Diptera: Phoridae) on two tissue types at three temperatures. Department of Entomology, Texas A&M University.
- Michael Sanders. 2014-2015. Thesis: Mycolactone serves as a mechanism regulating *Aedes aegypti* (Diptera: Culicidae) attraction and oviposition behavior. Department of Entomology, Texas A&M University. Co-advised with Dr. Craig Coates, Department of Entomology, Texas A&M University.
- Xinyang Zhang. 2012-2014. Thesis: Interkingdom communication between *S. epidermidis* and *Aedes aegypti* (Diptera: Calliphoridae). Department of Entomology, Texas A&M University. Co-advised with Dr. Craig Coates, Department of Entomology, Texas A&M University.
- Brandon Lyons. 2012-2014. Thesis: Heat-shock response of lesser mealworm (Coleoptera: Tenebrionidae) as response to insecticide resistance. Department of Entomology, Texas A&M University. Co-advised with Dr. Pete Teel, Department of Entomology, Texas A&M University.

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- Louise Cuttiford. 2012-2016. Thesis: Temporal and geographic variability in estimating time of placement of human remains: A validation of the development data of forensically important blow fly species in North America. Department of Entomology, Texas A&M University.
- Le Zheng. 2012-2017. Thesis: Microbe-blow fly (Diptera: Calliphoridae) interactions in response to nutritional variation of larval resource. Department of Entomology, Texas A&M University.
- Charity Owings. 2011-2012. Thesis: Variation in the development of blow flies from different populations in Texas. Department of Entomology, Texas A&M University.
- Jonathan Cammack. 2007-2009. Thesis: The effect of the pupal parasitoid *Nasonia vitripennis* (Walker) (Hymenoptera: Pteromalidae) on pupation depth of the green bottle fly *Lucilia sericata* (Meigen) (Diptera: Calliphoridae) in two soil compactions. Department of Entomology, Soils and Plant Sciences, Clemson University, Clemson, South Carolina. Co-chaired with Dr. Peter Adler, Clemson University.
- Stacy Boatright. 2007-2009. Thesis: Development and associative learning of *Cochliomyia macellaria*. Department of Entomology, Texas A&M University.
- Patrick McClellan. 2007-2009. Thesis: Insecticide resistance in house fly populations associated with dairies and egg layer facilities. Department of Animal Science. Tarleton State University, Stephenville, Texas. Co-chaired with Dr. David Kattes, Tarleton State University, Stephenville, Texas.
- Jennifer Pechal. 2006-2008. Thesis: Intraspecific gene flow and vector competence among *Periplaneta americana* cockroaches (Blattodea: Blattellidae) in central Texas. Department of Entomology, Texas A&M University. Co-chaired with Dr. Roger Gold, Department of Entomology, Texas A&M University.
- Heidi Brummond. 2005-2006. Thesis: Development of the black soldier fly (Diptera: Stratiomyidae) on dairy manure. Department of Animal Science. Tarleton State University, Stephenville, Texas. Co-chaired with Dr. David Kattes, Tarleton State University.

PhD Students

- Jennifer Rhinesmith. 2017-present. Dissertation: TBD. Department of Entomology, Texas A&M University.
- Casey Flint. 2017-present. Dissertation: TBD. Department of Entomology, Texas A&M University.
- Sam Sawyer. 2017-present. Dissertation: TBD. Department of Entomology, Texas A&M University.
- Fengchun “Spring” Yang. 2014-2020. Dissertation: Microbial function in starved and fed black soldier fly (Diptera: Stratiomyidae). Department of Entomology, Texas A&M University.
- Brittney Jones. 2014-2020. Dissertation: Impact of larval competition on adult mating success of the black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae). Department of Entomology, Texas A&M University.
- Zanthe Kotze. 2017-2019. Dissertation: TBD. Department of Entomology, Texas A&M University.

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- Dongmin Kim. 2016-2019. Dissertation: Interactions between *Mycobacterium ulcerans* and *Staphylococcus epidermidis* regulate *Aedes aegypti* (Diptera: Culicidae) attraction to hosts. Department of Entomology, Texas A&M University.
- Aline Spindola. 2016-2019. Dissertation: Adult life-history traits of the black soldier fly (Diptera: Stratiomyidae) impact mating success. Department of Entomology, Texas A&M University.
- Chelsea Holcomb. 2014-2019. PhD Dissertation: Interspecific and intraspecific competition between black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae) and house fly, *Musca domestica*, (L.) (Diptera: Muscidae) larvae in three manure types. Department of Entomology, Texas A&M University.
- Elida Espinoza. 2012-2017. Dissertation: The role of quorum sensing bacteria in the behavioral ecology of the red imported fire ant, *Solenopsis invicta* (Hymenoptera: Formicidae). Department of Entomology, Texas A&M University. Co-advised with Roger Gold, Department of Entomology, Texas A&M University.
- Chin Heo. 2012-2016. Dissertation: Resilience of the carrion system in response to arthropod delayed access. Department of Entomology, Texas A&M University.
- Meaghan Pimsler. 2010-2015. Dissertation: A functional genetic study of the behavioral ecology of *Chrysomya rufifacies* (Diptera: Calliphoridae); potential for sexual conflict in immature insects. Department of Entomology, Texas A&M University. Co-advised with Dr. Aaron Tarone, Department of Entomology, Texas A&M University, College Station, Texas.
- Wenqi Liu. 2010-2014. Dissertation: Response of *Lucilia sericata* (Diptera: Calliphoridae) to quorum-sensing molecules from *Proteus mirabilis*. Co-advised with Dr. Aaron Tarone, Department of Entomology, Texas A&M University.
- Micah Flores. 2007-2013. Dissertation: Development and chemical ecology of *Chrysomya rufifacies*. Department of Entomology, Texas A&M University, College Station, Texas.
- Jennifer Pechal. 2009-2012. Dissertation: Blow fly competition through manipulation of microbial communities on ephemeral resources. Department of Entomology, Texas A&M University, College Station, Texas.
- Rachel Mohr. 2008-2012. Dissertation: Impact of carrion age, and ovarian development on carrion colonization activity of *Cochliomyia macelleria* (Fabricius). Department of Entomology, Texas A&M University, College Station, Texas.
- Adrienne Brundage. 2008-2012. Dissertation: Bacterial mediated intra- and interspecific interactions in the Calliphoridae with special reference to forensically important species. Department of Entomology, Texas A&M University, College Station, Texas.
- Michelle Sanford. 2005-2010. Dissertation: Behavioral responses of *Culex quinquefasciatus* exhibited through associative learning. Department of Entomology, Texas A&M University, College Station, Texas.

GRADUATE STUDENT COMMITTEES

MS Students

- Le Zheng. 2015-2016. A Workflow for Building Postmortem Predictive Model Using Bacterial Community. Department of Statistics, Texas A&M University.
- Isabell Gallegos. 2015-2016. Department of Biotechnology, Texas A&M University.

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- Ansley Silva. 2014-2016. MS Thesis: Effects of chemical contaminants on coleopteran carrion assemblages. Department of Entomology, University of Georgia.
- Gabrielle Trissini. 2014-2015. MS Thesis: Impact of the presence of intraspecific larvae on the attraction of the native blow fly *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae) and its forensic implication. Dipartimento di Biologia e Biotechnologie "L. Spallanzani," Università Degli Studi di Pavia.
- Ernie Ramos. 2011-2015. MS Thesis: A genetic study of the development of *Cochliomyia macellaria* (Fabricius; Diptera: Calliphoridae): Ecological, evolutionary, and forensic importance of the secondary screwworm. Department of Entomology, Texas A&M University.
- Samantha Casas. 2014-present. MS Thesis: Life-history traits of immature *Blaesoxipha plinthopyga* (Diptera: Sarcophagidae) developing on beef, chicken, and swine muscle tissue. Department of Biology, University of Texas Pan-American.
- Danielle Flores. 2014-2015. MS Thesis: High content fluorescent imaging of posterior spiracle of transitioning second and third instar *Chrysomya rufifacies* (Diptera: Calliphoridae). Forensic Sciences Unit, Chaminade University.
- Aline Spindola. 2013-2014. MS Thesis: Attraction and oviposition of *Lucilia eximia* (Diptera: Calliphoridae) to resources colonized with the predator, *Chrysomya albiceps* (Diptera: Calliphoridae). Universidade Estadual de Campinas. Brazil.
- Amber Kendrick. 2013-2014. Non-thesis MS Department of Veterinary Physiology and Pharmacology, Texas A&M University.
- Leslie Holmes. 2008-2010. MS Thesis: Abiotic factors affecting pupation and larval development of the black soldier fly (Diptera: Stratiomyidae). Department of Biological Sciences, University of Windsor, Canada.
- Trinh Nguyen. 2008-2010. MS Thesis: Life-history traits of black soldier flies reared on different mediums. Department of Biological Sciences, University of Windsor, Canada.
- Prashant Amatya. 2007-2009. MS Thesis: Economics of black soldier fly in dairy waste management. Department of Agronomy, Agribusiness, Horticulture, and Range Management, Tarleton State University, Stephenville, Texas.
- Jordan Coburn. 2007-2009. MS Thesis: Meteorological Factors Regulating the Population Expansion and Contraction of *Amblyomma maculatum* (Acari: Ixodidae) in Texas. Department of Entomology, Texas A&M University, College Station, Texas.
- Qiaolin Lui. 2007-2008. Supervisor. MS Thesis: Black soldier fly (Diptera: Stratiomyidae) larvae reduce *Escherichia coli* in dairy manure. National Engineering Research Center of Microbe Pesticide, National Key Laboratory of Agromicrobiology, Huazhong Agricultural University, Wuhan, Hubei, China.
- Rachel Wynalda. 2006-2008. MS Thesis: Nutrient regulation of an unidentified, exotic *Paratrechina* sp. (Hymenoptera: Formicidae) found in the continental United States. Department of Entomology, Texas A&M University, College Station, Texas.
- Jessica Lyles. 2006-2007. MS Thesis: The role of red imported fire ants (*Solenopsis invicta*) on decomposition rates and postmortem interval (PMI). Department of Anthropology, Texas State University, San Marcos, Texas.

PhD Committees

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- Trevor Fowles. 2018-present. PhD Dissertation: Applied and targeted evolution of insect lineages to bioconvert pre-consumer organic wastes. Department of Entomology, University of California, Davis.
- Vadim Mesli. 2016-present. PhD Dissertation: Interactions between insects and bacteria on cadavers. Centre Hospitalier Régional Universitaire de Lille.
- Denise Gemmellaro. 2015-2019. PhD Dissertation: An analysis of species composition and abundance of necrophilous Diptera along an altitudinal gradient and its effect on colonization. Department of Entomology, Rutgers University.
- Bekka S. Brodie. 2015 (co-examiner). PhD Dissertation: Foraging and communication ecology of the common green bottle fly, *Lucilia sericata* (Meigen) (Diptera: Calliphoridae). Department of Biological Sciences, Simon Fraser University.
- Hee Kim. 2014-2017. PhD Dissertation: Vector-host-habitat interactions of *Ornithodoros turicata* (Argasidae) in Texas, USA. Department of Entomology, Texas A&M University.
- Chris Keefer. 2014-2015. PhD Dissertation: Biology, diet preferences, and control of the dark rover ant *Brachymyrmex patagonicus* (Hymenoptera: Formicidae) in Texas. Department of Entomology, Texas A&M University.
- Ashleigh Faris. 2013-2017. PhD Dissertation: Ecological modeling, gene expression, and validation of the secondary screwworm, *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae) for determining time of colonization. Department of Entomology, Texas A&M University.
- Taylor Donaldson. 2013-2018. PhD Dissertation: The phylogenetic relationship, cross mating, and development of *Amblyomma cajennense* and *A. imitator* and the potential role of male ticks in the transmission and maintenance of *Theileria equi*. Department of Entomology, Texas A&M University.
- Cassie Schoenthal. 2012-2015. PhD Dissertation: Monitoring and management of *Culicoides* spp. (Diptera: Ceratopogonidae) in white-tailed deer (*Odocoileus virginianus*) production facilities at Texas A&M University. Department of Entomology, Texas A&M University.
- Lauren Weidner. 2011-2015. PhD Dissertation: Biology and ecology of forensically important blow flies (Diptera: Calliphoridae) in New Jersey with a focus on the black blow fly *Phormia regina*. Department of Entomology, Rutgers University.
- Ben Alexander. 2009-2014. PhD Dissertation: Detection of decomposing materials in plant material. Department of Crop and Soil Science, Texas A&M University.
- Louis Alvarez. 2008-2012 (co-examiner). PhD Dissertation: The use of black soldier fly for sustainable waste management in northern climates. University of Windsor.
- Carolina Núñez Vázquez. 2008-2011. PhD Dissertation: Identification and succession of entomofauna associated with human remains in Buenavista, Saltillo, Coahuila, Mexico. Universidad Autónoma Agraria Antonio Narro (UAAAN), Saltillo, Mexico.
- Santiago Vergara Pineda. 2008-2011. PhD Dissertation: Arrival, dispersal, and molecular identification of two species of Calliphoridae at Buenavista, Saltillo, Coahuila, Mexico. Universidad Autónoma Agraria Antonio Narro (UAAAN), Saltillo, Mexico.
- Stefan Diener. 2006-2010 (co-examiner). PhD Dissertation: Valorisation of organic solid waste using the black soldier fly, *Hermetia illucens*, in low and middle-income

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countries. Swiss Federal Institute of Aquatic Science and Technology (EAWAG), Swiss Federal Institute of Technology Zurich, Zurich, Switzerland.

GRADUATE AND UNDERGRADUATE STUDENT MENTORSHIP

Graduate

- Martin, A. 2013-2014. Faculty Mentor, Graduate Teaching Academy. Texas A&M University.
- Barman, A. 2009-2010. Faculty Mentor, Graduate Teaching Academy. Texas A&M University.
- Chalaire, K. 2008-2009. Faculty Mentor, Graduate Teaching Academy. Texas A&M University.
- Coburn, J. 2007-2008. Faculty Mentor, Graduate Teaching Academy. Texas A&M University.

Undergraduate

- Peña, A. 2010-present. Century Scholars Program. Texas A&M University.

UNDERGRADUATE ADVISOR

- Jones, A. 2017-2018. Taxonomic resolution provides greater insight to impact of mass mortality events on local ecosystems. Undergraduate Honor's Thesis, Texas A&M University.
- Serewis-Pond, C. 2015-2016. Mycolactone dose effects on successful blood meals for *Aedes aegypti*. Undergraduate Honor's Thesis, Texas A&M University.
- Sweetser, C. 2015-2016. Analysis of a forensically important successional relationship between *Chrysomya rufifacies* (Diptera: Calliphoridae) on *Hermetia illucens* (Diptera: Stratiomyidae). Undergraduate Honor's Thesis, Texas A&M University.
- Tirloni, A. 2015-2016. Analysis of a forensically important successional relationship between *Chrysomya rufifacies* (Diptera: Calliphoridae) on *Hermetia illucens* (Diptera: Stratiomyidae). Undergraduate Honor's Thesis, Texas A&M University.
- Thornton, S. 2013-2015. Potential mechanism for differentiating conspecific and heterospecific offspring of competing blow flies (Diptera: Calliphoridae). Undergraduate Honor's Thesis, Texas A&M University.
- Littlefield, K. 2006. Effects of condensed tannins on the development of dipteran larvae. Tarleton State University, Stephenville, Texas.

UNDERGRADUATE COMMITTEES

- Dell, Z. 2014-2015. Application of near-infrared reflectance spectroscopy to estimate post mortem interval. Undergraduate Honor's Thesis, Texas A&M University. P. Teel, Chair, Department of Entomology, Texas A&M University.
- Vaughn, M. 2010-2011. Effects of sun and shade on blow fly (Diptera: Calliphoridae) colonization of pig carrion in southern Georgia. ASPIRES Program, Georgia Southern University, Statesboro, Georgia.
- Poage, C. 2007-2008. Effects of caffeine on blow fly larval development. Plan II Honors. <http://www.utexas.edu/cola/progs/plan2/> College of Liberal Arts, The University of Texas, Austin, Texas.

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WORKSHOPS

1. Forensic Entomology. 2019. Conroe Crime Scene Investigation.
2. Forensic Education Programs Education Commission. 2018. American Academy of Forensic Sciences. Seattle, Washington.
3. Viewing Research Through Different Lenses: How to Achieve Success in Court. 2017. American Academy of Forensic Sciences Conference. New Orleans, Louisiana.
4. Research Networking Event: Microbiota Research Interest Group. 2016. Texas A&M University.
5. Genomics- Wildlife Forensics and Next Generation Sequencing: The Next Technological Frontier. 2015. Joint Society for Wildlife Forensic Science and North American Forensic Entomology Association Meeting. Missoula, Montana. Co-organized with Dr. Mary Curtis.
6. Forensic Microbiology. 2014. Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal.
7. Forensic Entomology. 2014. Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal.
8. Forensic Microbiology: Where Do We Begin? 2014. American Academy of Forensic Sciences Conference, Seattle, Washington.
9. Integration of Veterinary Medicine and Entomology in Forensics. 2013. School of Veterinary Medicine, Texas A&M University.
10. Skeletal Death Investigation. Texas Engineering Extension Service. 2012. Texas State University.
11. Forensic Entomology. 2012. Evidence Response Team, Federal Bureau of Investigation, Houston, Texas.
12. Forensic Entomology. 2012. San Antonio Police Department, San Antonio, Texas.
13. Forensic entomology. 2011. San Antonio Police Department, College Station, Texas.
14. Forensic entomology. 2011. Department of Anthropology, Texas State University, San Marcos, Texas.
15. Forensic Science Educator Training. 2010. Sam Houston University, Huntsville, Texas.
16. Evidence Recovery Team: Federal Bureau of Investigation. 2010. Department of Anthropology, University of Tennessee, Knoxville, Tennessee.

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17. Forensic entomology. 21 December 2009. Cedar Hill Police Department, Cedar Hill, Texas.
18. Investigative forensics. 2009-present. Annual Youth Adventure Program. Texas A&M University.
19. Forensic entomology. 20-25 October 2008. La Universidad Autónoma Agraria Antonio Narro. Saltillo, Mexico.
20. Forensic entomology. 6-10 October 2008. Texas Engineering Extension Service. Texas A&M University.
21. Investigative forensics. 2008-2011. Youth Adventure Program. Texas A&M University.
22. Flies, features, and foliage. 12-14 May 2008. American Academy of Applied Forensics. Central Piedmont Community College, Charlotte, North Carolina.
23. Bugs and bones. 18-19 November 2006. Texas State University. San Marcos, Texas.
24. Forensic entomology. 11 April 2006. Abilene Police Department. Abilene, Texas.
25. Advanced body search and recovery workshop. 12-15 March 2006. Texas State University. San Marcos, Texas.
26. Forensic entomology. 14-15 September 2005. Texas Agriculture Experiment Station, Stephenville, Texas.
27. Flies, features, and foliage workshop. 6-8 June 2005. American Academy of Applied Forensics. Central Piedmont Community College, Charlotte, North Carolina.
28. Forensic entomology. 15-17 May 2005. American Academy of Applied Forensics. Central Piedmont Community College, Charlotte, North Carolina.
29. Forensic entomology. 23-24 September 2004. Federal Bureau of Investigation. Houston, Texas.
30. Crime scene techniques. 12-15 July 12-15. American Academy of Applied Forensics. Central Piedmont Community College, Charlotte, North Carolina.
31. Flies, Features, and Foliage. 8-11 June 2004. American Academy of Applied Forensics. Central Piedmont Community College, Charlotte, North Carolina.
32. Forensic entomology. 14-15 February 2004. Air Force Office of Special Investigations, Texas Agricultural Experiment Station, Texas A&M University, Stephenville, Texas.

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PRESENTATIONS AT PROFESSIONAL MEETINGS

¹MS student advisor, ²PhD student advisor, ³served on graduate committee, ⁴Undergraduate student research, ⁵visiting scientist or student, ⁶postdoctoral advisor)

1. ⁴Graham, S., S.J. Sawyer², and **J.K. Tomberlin**. 2020. Longevity of adult *Lucilia eximia* (W.) (Diptera: Calliphoridae) under standard conditions. Digital World Congress Forensic Entomology (online).
2. ¹Bauer, A., A. Bauer¹, and **J.K. Tomberlin**. 2020. Impact of diet moisture on the development of the forensically important blow fly *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae). North American Forensic Entomology Association. On-line platform.
3. ⁶Rusch, T., **J.K. Tomberlin**, and A.M. Tarone. 2020. Consideration for the critical and preferred temperatures for oviposition of two forensically relevant blow fly species *Chrysomya rufifacies* Macquart (Diptera: Calliphoridae) and *Cochliomyia macellaria* Fabricius (Diptera: Calliphoridae). North American Forensic Entomology Association. On-line platform.
4. ²Flint, C. and **J.K. Tomberlin**. 2020. Storage method and microbiome regulating decomposition and attraction of the blow fly, *Cochliomyia macellaria*. North American Forensic Entomology Association. On-line platform.
5. ¹Bauer, A., A. Bauer¹, and **J.K. Tomberlin**. 2020. Effects of photoperiod on the development of forensically important blow fly *Chrysomya rufifacies* (Diptera: Calliphoridae). North American Forensic Entomology Association. On-line platform.
6. ²Sawyer, S., and **J.K. Tomberlin**. 2020. Habitat, season, and carrion type impact competition between vertebrate and invertebrate scavengers in southeast Texas. North American Forensic Entomology Association. On-line platform.
7. ²Flint, C.A., and **J.K. Tomberlin**. 2020. Small but Mighty: Microbes influencing decomposition and attraction of the blow fly, *Cochliomyia macellaria*. Texas A&M University, Ecological Integration

Symposium Annual Meeting, College Station, Texas.

8. ²Sawyer, S.J., and **J.K. Tomberlin**. 2020. Vultures, ants, and flies oh my! Competition for small carrion across habitat, season, and carcass type. 21st Annual Ecological Integration Symposium, College Station Texas.
9. ²Kotze, Z., and **J.K. Tomberlin**. 2019. Mechanisms regulating attraction and colonization by flies of forensic importance. National: Entomological Society of America, St. Louis, Missouri.
10. ²Jones, B., and **J.K. Tomberlin**. 2019. Impact of larval competition on life-history traits of the black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae), including mating success: Does size matter? National: Entomological Society of America, St. Louis, Missouri.
11. Gates, E.M., J.H. Sweeney, **J.K. Tomberlin**, and R. Puckett. 2019. Ants and acetone: A story of not-so strange attraction. National: Entomological Society of America, St. Louis, Missouri.
12. ⁶Rusch, T. **J.K. Tomberlin**, and A.M. Tarone. 2019. Development responses of a forensically important blow fly (*Cochliomyia macellaria*) to fluctuating temperatures. National: Entomological Society of America, St. Louis, Missouri.
13. Heo, C.C., M. Hauser, and **J.K. Tomberlin**. 2019. Importance of taxonomy and population genetics in black soldier fly production. National: Entomological Society of America, St. Louis, Missouri.
14. **Tomberlin, J.K.** 2019. Outreach for the insects as food and feed: Creating a foundation of consumers. National: Entomological Society of America, St. Louis, Missouri.
15. ²Kotze, Z., and **J.K. Tomberlin**. 2019. Mechanisms regulating behavior of invertebrate decomposers: Deciphering arthropod succession as related to forensic entomology. North American Forensic Entomology Association Annual Meeting, Indianapolis, Indiana.
16. ¹Flint, C., and **J.K. Tomberlin**. 2019. Optimizing a Dual-Choice Cube Olfactometer Design for Measuring Blow Fly Attraction. North American Forensic Entomology Association Annual Meeting, Indianapolis, Indiana.

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17. ⁵Sharma, A., F.P. Drijfhout, **J.K. Tomberlin**, and M. Bala. 2019. Cuticular hydrocarbons as a tool for determining age of *Chrysomya rufifacies* (Diptera: Calliphoridae) larvae. European Association for Forensic Entomology Conference, Bordeaux, France.
18. Gardner, K. M. Khan, J.C. Padgett, **J.K. Tomberlin**, and C. Bailey. 2019. Evaluation of black soldier fly larvae substituting soybean meal at two inclusions on broiler performance. Poultry Science Association Annual Meeting, Montreal, Canada.
19. Puckett, R., **J.K. Tomberlin**, and J.H. Sweeney¹. 2018. Exploiting interkingdom communication for red imported fire ant management. National: Entomological Society of America, Vancouver, Canada.
20. ²Saywer, S.J., B. Barton, M. Lashley, H.R. Jordan, and **J.K. Tomberlin**. 2018. Vertebrate scavenger access to mass mortality events impact associated arthropod community structure. National: Entomological Society of America, Vancouver, Canada.
21. ⁶Rusch, T.W., **J.K. Tomberlin**, and A.M. Tarone, 2018. Where to dump the kids? Oviposition site selection in a forensically important blowfly (*Cochliomyia macellaria*) when considering temperature, conspecifics, and predators. National: Entomological Society of America, Vancouver, Canada.
22. ⁶Delclos, P., T. Starr⁴, and **J.K. Tomberlin**. 2018. Olfactory choice for carrion age in the burying beetle *Nicrophorus vespilloides*: Preference or aversion? National: Entomological Society of America, Vancouver, Canada.
23. Pechal, J., M. DuPonte, J.A. Cammack⁶, T.L. Crippen, H. Jordan, **J.K. Tomberlin**, and M.E. Benbow. 2018. Does indigenous microorganism management impact the Calliphoridae microbiome? National: Entomological Society of America, Vancouver, Canada.
24. Puckett, R., **J.K. Tomberlin**, and J.H. Sweeney¹. 2018. Exploiting interkingdom communication for red imported fire ant management. National: Entomological Society of America, Vancouver, Canada.
25. ⁶Cammack, J.A., J. Pechal, H. Jordan, A. Faris, T.L. Crippen, S. Sweet, A. Knap, M.E. Benbow, M. DuPonte, and **J.K. Tomberlin**. 2018. IMO swine production reduces noxious odors attractive to filth flies. National: Entomological Society of America, Vancouver, Canada.
26. ⁵Scala, A., R. Salvia, **J. Tomberlin**, and P. Falabella. 2018. Different rearing substrates exhibit direct influence on growth and macronutrient composition of *Hermetia illucens* (L.) (Diptera: Stratiomyidae) larvae at an industrial scale. 4th Insecta International Conference, Gießen, Germany.
27. **Tomberlin, J.K.** 2018. Micronutrients and their role in mass production of the black soldier fly. Eating Insects Conference, Athens, Georgia.
28. ⁵Spindola, A.F., E. Walsh, T. Rusch, A. Tarone, J. Rangel, and **J.K. Tomberlin**. 2018. Thermal preference and sperm viability of black soldier fly across ages and temperatures. Eating Insects Conference, Athens, Georgia.

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29. ⁶Cammack, J.A., H.R. Jordan, and **J.K. Tomberlin**. 2018. Diet nutrient and moisture content and black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae) feeding impact the structure and function of diet. Eating Insects Conference, Athens, Georgia.
30. ²Jones, B., and **J.K. Tomberlin**. 2018. Impact of larval competition on life-history traits of the black soldier fly, *Hermetia illucens*, (L.) (Diptera: Stratiomyidae). Eating Insects Conference, Athens, Georgia.
31. ⁴Tharp, H.I., J.C. Leaphart, **J.K. Tomberlin**, and J.C. Beasley. 2018. Influence of invertebrate scavenging on the fate and transport of ¹³⁷Cs within food webs. International Conference on Heavy Metals in the Environment. Athens, Georgia.
32. Baruzzi C, B. Barton, H.R. Jordan, **J.K. Tomberlin**, M.V. Cove, and M. Lashley. Functional and behavioral responses nonlinearly increase vulture carrion consumption with increasing scale of mass mortality events. Ecological Society of America Meeting 2018, New Orleans, Louisiana.
33. Baruzzi C, B. Barton, H.R. Jordan, **J.K. Tomberlin**, M.V. Cove, and M. Lashley. Vulture nonlinearly increase carrion consumption with increasing carrion biomass. The Wildlife Society Conference 2018, Cleveland, Ohio.
34. **Tomberlin, J.K.** 2018. Conclusions and recommendation. Insects Feed the World Conference, Wuhan, China.
35. ²Yang, F., **J.K. Tomberlin**, and H.R. Jordan. 2018. How does starvation of black soldier fly (Diptera: Stratiomyidae) larvae impact bacteria? Insects Feed the World Conference, Wuhan, China.
36. ²Miranda, C., and **J.K. Tomberlin**. 2018. Life-history traits of the housefly, *Musca domestica* L. (Diptera: Muscidae), reared on three manure types. Insects Feed the World Conference, Wuhan, China.
37. ⁶Cammack, J.A., L. Zheng, H.R. Jordan, and **J.K. Tomberlin**. 2018. Impact of diet nutrition and moisture on the bacterial community associated with *Hermetia illucens* (L.). Insects Feed the World Conference, Wuhan, China.
38. ³Kooienga, E., K. Franks, **J.K. Tomberlin**, and H.R. Jordan. 2018. Effect of bacterial supplementation on black soldier fly growth and conversion. Insects Feed the World Conference, Wuhan, China.
39. Cai, M., R. Hu, S. Ma, **J.K. Tomberlin**, C. Yu, K. Zhang, W. Li, Q. Li, Z.N. Yu, and J.B. Zhang. 2018. The degradation of tetracycline by black soldier fly (Diptera: Stratiomyidae) larvae with intestinal bacteria. Insects Feed the World Conference, Wuhan, China.
40. Cai, M., S. Ma, R. Hu, **J.K. Tomberlin**, L. Zheng, W. Li, Z. Yu, and J. Zhang. 2018. Attenuation of antibiotic resistance genes in chicken manure by black soldier fly larval conversion. Insects Feed the World Conference, Wuhan, China.
41. Heo, C.C., T. Crippen, J. Aitkenhead-Peterson, P. Teel, A. Tarone, and **J.K. Tomberlin**. 2018. Delayed Diptera colonization on carrion: What does it mean in forensic entomology? European Association for Forensic Entomology. Munich, Germany.

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42. ⁵Bauer, A., S. Sawyer, A. Jones, B. Barton, M. Lashley, H. Jordan, and **J.K. Tomberlin**. 2018. Mass mortality events impacts on arthropods community composition. European Association for Forensic Entomology. Munich, Germany.
43. ²Espinoza, E., T.L. Crippen, A.M. Tarone, **J.K. Tomberlin**, and R. Gold. 2017. Bacterial community of *Solenopsis invicta* Buren according to colony, ecoregion, and functional group. National: Entomological Society of America, Denver, Colorado.
44. ¹Mashlawi, A., H.R. Jordan, T.L. Crippen, and **J.K. Tomberlin**. 2017. *Mycobacterium ulcerans* toxin regulates survivorship, development, and resulting oviposition preferences of *Aedes aegypti*. National: Entomological Society of America, Denver, Colorado.
45. ⁵Richard-Giroux, J., A.F. Spindola², G.W. Vandenberg, M.H. Deschamps, and **J.K. Tomberlin**. 2017. Impact of sucrose on black soldier fly longevity and egg production. National: Entomological Society of America, Denver, Colorado.
46. ²Heo, C.C., T.L. Crippen, J. Aitkenhead-Peterson, P. Teel, A. Tarone, and **J.K. Tomberlin**. 2017. Carrion with delayed Diptera colonization: Implications in decomposition ecology and forensic entomology. National: Entomological Society of America, Denver, Colorado.
47. Barton, B.T., M.A. Lashley, H.R. Jordan, and **J.K. Tomberlin**, 2017. What happens when everything dies? Ecosystem responses to an experimental mass mortality event. Ecological Society of America Conference, Portland, Oregon.
48. ²Espinoza, E., T.L. Crippen, R. Gold, and **J.K. Tomberlin**. 2017. Bacterial community diversity of *Solenopsis invicta* Buren according to colony, ecoregion, and functional category. Southwestern Branch: Entomological Society of America, Austin, Texas.
49. ²Kim, D., T.L. Crippen, and **J.K. Tomberlin**. 2017. Disrupting bacterial communication- a novel method for reducing mosquito attraction to a host. Southwestern Branch: Entomological Society of America, Austin, Texas.
50. ¹Sweeney, J.H., R. Puckett, T.L. Crippen, and **J.K. Tomberlin**. 2017. Bacterial volatiles mediate foraging behavior of the red imported fire ant. Southwestern Branch: Entomological Society of America, Austin, Texas.
51. ¹Mashlawi, A., H.R. Jordan, T.L. Crippen, and **J.K. Tomberlin**. 2017. Impact of mycolactone produced by *Mycobacterium ulcerans* on life-history traits of *Aedes aegypti* (Diptera: Culicidae). Southwestern Branch: Entomological Society of America, Austin, Texas.
52. **Tomberlin, J.K.** and J.A. Cammack⁶. 2017. Forensic entomology and its applications today. Workshop #22: Viewing Research Through Different Lenses: How to Achieve Success in Court. American Academy of Forensic Sciences Conference, New Orleans, Louisiana.
53. **Tomberlin, J.K.** and J.A. Cammack⁶. 2017. Limitations and applications of forensic entomology. Workshop #22: Viewing Research Through Different Lenses: How to Achieve Success in Court. American Academy of Forensic Sciences Conference, New Orleans, Louisiana.

54. Heo, C.C. and **J.K. Tomberlin**. 2017. Arthropods, microbes, and soil chemistry dynamics associated with delayed carrion decomposition: Implications to public health. 26th International Conference of the World Association for the Advancement of Veterinary Parasitology, Kuala Lumpur, Malaysia.
55. ⁶Cammack, J.A., **J.K. Tomberlin**, K. Beskin, and C. Holcomb. 2016. Bioconversion by the black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae): Prospects for managing organic waste and filth flies. International Congress of Entomology. Orlando, Florida.
56. ¹Cuttiford, L., M.L. Pimsler, C.C. Heo, L. Zheng, I. Karunaratne, G. Trissini, A.M. Tarone, S. Lambiase, J.A. Cammack⁶, and **J.K. Tomberlin**. 2016. "Validation" of development data sets for *Hermetia illucens* (L.) (Diptera: Stratiomyidae) for estimating the time of placement of human and swine remains in Texas, USA. North American Forensic Entomology Association. At 2016 XXV International Congress of Entomology. Orlando, Florida.
57. ²Espinoza, E., **J.K. Tomberlin**, and R. Gold. 2016. Red imported fire ant (*Solenopsis invicta* Buren) foraging behavior in the presence of swarming bacteria *Proteus mirabilis*. International Congress of Entomology. Orlando, Florida.
58. ²Espinoza, E., **J.K. Tomberlin**, R. Gold, and T.L. Crippen. 2016 Red imported fire ant (*Solenopsis invicta* Buren) foraging behavior in the presence of swarming bacteria *Proteus mirabilis*. Southwestern Branch: Entomological Society of America. Tyler, Texas.
59. ²Pimsler, M.L., S.-H. Sze, S. Fu, M. Scott, **J.K. Tomberlin**, and A.M. Tarone. 2015. Let's talk about sex; Sexual dimorphism in immature development and gene expression in *Chrysomya rufifacies* (Diptera: Calliphoridae). Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
60. ²Heo C.C. and **J.K. Tomberlin**. 2015. Ecosystem resilience on carrion with delayed Diptera colonization. Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
61. ²Zheng, L., T.L. Crippen, M. Espinoza², A. Gord, and **J.K. Tomberlin**. 2015. Expanding the nutri on ecology framework: Microbes as a mechanism regulating resource acquisition and utilization by primary and secondary consumers. Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
62. ¹Beskin, K., **J.K. Tomberlin**, and C. Holcomb². 2015. Impact of larval digestion of different manure types by the black soldier fly, *Hermetia illucens*, (L.) (Diptera: Stratiomyidae) on volatile emissions. Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
63. ¹Sanders, M., **J.K. Tomberlin**, C.J. Coates, and H. Jordan. 2015. The effect of *Mycobacterium ulcerans* exotoxin on host-seeking and oviposition behavior of *Aedes aegypti aegypti* (L.) (Diptera: Culicidae). Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
64. Sanders, M., J.L. Pechal, P.L.C. Small, E. Anagonou, Y. Barogui, G. Sopoh, C. Johnson, M.E. Benbow, **J.K. Tomberlin**, and H.R. Jordan. 2015.

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- Ecology and Transmission Dynamics of *Mycobacterium ulcerans*. American Society of Microbiology South Central Branch Meeting, Hattiesburg, Mississippi.
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174. Rains, G.C., and **J.K. Tomberlin**. 2007. Testing of insects for innate response to volatile compounds for a forensic application. 12th Institute of Biological Engineering Conference. St. Louis, Missouri.
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 194. **Tomberlin, J.K.** and J.R. Wallace. 2005. Review constitution and hold elections. North American Forensic Entomology Conference. Orlando, Florida.
 195. Shaw, S., M. Yu, and **J.K. Tomberlin**. 2005. Economic analysis of manure digestion with black soldier fly in the cross timber area. Student Research Symposium. Tarleton State University. Stephenville, Texas.
 196. Collins, B., C. Suh, and **J.K. Tomberlin**. 2005. Alternative methods used to preserve insect evidence from crime scenes for analysis by a forensic entomologist. National Society for Minorities in Agriculture, Natural Resources and Related Sciences. Pittsburg, Pennsylvania.
 197. **Tomberlin, J.K.**, M.A. Albert, J.H. Byrd, and D.W. Hall. 2005. Interdisciplinary forensic science workshops: a venue for data collection. American Academy of Forensic Sciences. New Orleans, Louisiana.
 198. Kimbirauskas, R.K., R.W. Merritt, M.E. Benbow, J.R. Wallace, and **J.K. Tomberlin**. 2005. An instructional DVD on collecting entomological evidence for court. American Academy of Forensic Sciences. New Orleans, Louisiana.
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 200. **Tomberlin, J.K.**, J.R. Wallace, and R.W. Merritt. 2004. The future of forensic entomology. North American Forensic Entomology Conference. Davis, California.
 201. **Tomberlin, J.K.**, J.R. Wallace, E. Benbow, R.K. Kimbirauskas, and R. Bullard. 2004. Development and initiation of the North American Forensic Entomology Association. North American Forensic Entomology Conference. Davis, California.
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211. **Tomberlin, J.K.** 2004. Nutrient recycling with black soldier flies. Texas Chapter: American Society of Agronomy. Stephenville, Texas.
212. Brummond, H. and **J.K. Tomberlin.** 2004. Using the black soldier fly to estimate postmortem intervals. Texas Chapter: American Society of Agronomy. Stephenville, Texas.
213. **Tomberlin, J.K.** and B. Whitney. 2003. Using black soldier fly larvae to reduce house fly populations and manure in calf facilities. National: Entomological Society of America. Cincinnati, Ohio.
214. **Tomberlin, J.K.** and J.H. Byrd. 2003. The state of forensic entomology in the U.S. and abroad. North American Forensic Entomology Conference. Las Vegas, Nevada.
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216. **Tomberlin, J.K.**, M. Tertuliano, G. Rains, Z. Jurjevic, and J. Lewis. 2003. The wasp hound: Detection and discrimination between *Aspergillus* species. Southwestern Branch: Entomological Society of America. Oklahoma City, Oklahoma.

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221. **Tomberlin, J.K.**, W.J. Lewis, G.C. Rains, J.H. Tumlinson, and D.M. Olson. 2001. Parasitoids as chemical biosensors: Prospects, strategies, and status of applications. National: Entomological Society of America. San Diego, California.
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227. **Tomberlin, J.K.**, D.C. Sheppard, and J.A. Joyce. 2000. Susceptibility of black soldier fly larvae, *Hermetia illucens* (L.), larvae to two insect growth regulators (IGR): Implications for integrated pest management in livestock. Livestock Insect Workers conference. St. Augustine, Florida.
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229. **Tomberlin, J.K.** and D.C. Sheppard. 2000. The effects of two insect growth regulators (IGR) on the larval development of the black soldier fly. Georgia Entomological Society. Athens, Georgia.
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231. **Tomberlin, J.K.** and D.C. Sheppard. 2000. A comparison of three diets for the production of black soldier flies in the laboratory. Southeastern Branch: Entomological Society of America. Mobile, Alabama.
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233. **Tomberlin, J.K.**, D.C. Sheppard and J. Joyce. 1999. Competition between house fly and black soldier fly larvae. National: Entomological Society of America. Atlanta, Georgia.
234. Sheppard, D.C. and **J.K. Tomberlin**. 1999. Adverse effects on house fly larvae when reared with black soldier fly larvae. Livestock Insect Work Conference. Chattanooga, Tennessee.
235. **Tomberlin, J.K.** and D.C. Sheppard. 1999. Lekking behavior of the black soldier fly, *Hermetia illucens* (L.). Livestock Insects Workers Conference. Chattanooga, Tennessee.
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239. **Tomberlin J.K.** and D.C. Sheppard. 1999. Competition between house fly and black soldier fly larvae: Implications for integrated pest management in poultry. Southeastern Branch: Entomological Society of America. Destin, Florida.
240. **Tomberlin, J.K.** 1998. Diptera colonization of rat carrion in submerged and terrestrial environments in upstate South Carolina. National: American Academy of Forensic Sciences. San Francisco, California.
241. **Tomberlin, J.K.** 1997. Seasonality and succession of sarcophagous Diptera on rat carrion in South Carolina. National: Entomological Society of America. Nashville, Tennessee.
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245. **Tomberlin, J.K.** 1996. Clemson University: Excellence through time. Southeastern Branch: Entomological Society of America. Biloxi, Mississippi.
246. **Tomberlin, J.K.** and R.P. Griffin. 1996. Pesticide efficacy on major pest of commercial tomatoes. Southeastern Branch: Entomological Society of America. Biloxi, Mississippi.
247. **Tomberlin, J.K.** 1996. A comparison between terrestrial and submerged carrion during the winter and summer in upstate South Carolina. Southeastern Branch: Entomological Society of America. Biloxi, Mississippi.
248. **Tomberlin, J.K.** 1995. A comparison between terrestrial and submerged carrion during the summer and winter in upstate South Carolina. South Carolina Entomological Society. Hickory Knob State Park, South Carolina.
249. **Tomberlin, J.K.** and R.P. Griffin. 1995. Evaluations of insecticide efficacy on various pests of commercial tomatoes. South Carolina Entomological Society. Hickory Knob State Park, South Carolina.

POSTERS AT PROFESSIONAL MEETINGS

1. ⁴Brownfield, E., C.A. Flint², L. Gore⁴, and **J.K. Tomberlin**. The Effect of Resource Storage Methods on *Cochliomyia macellaria* Attraction: Frozen versus Refrigerated. Texas A&M University Ecological Integration Symposium Annual Meeting, College Station, Texas.
2. ⁴Denton, K. O. Crozier⁴, S. Graham⁴, S.J. Sawyer², **J.K. Tomberlin**. 2020. Longevity and Resiliency of Adult *Lucilia eximia* (Weidman) (Diptera: Calliphoridae) Males and Females Under Standard Conditions. 21st Annual Ecological Integration Symposium, College Station Texas.
3. ⁴Crozier, O., S. Graham⁴, K. Denton⁴. S.J. Sawyer², T.W. Rusch³, **J.K. Tomberlin**. 2020. Voluntary thermal maximum of *Lucilia eximia* (Weidman) (Diptera: Calliphoridae) larvae. 21st Annual Ecological Integration Symposium, College Station Texas.
4. Oonincx, D.G.A.B., G. Bosch, M. van der Borght, R. Smets, L. Gasco, A. J. Fascetti, Z. Yu, V. Johnson, **J.K. Tomberlin**, and M.D. Finke. 2019. A cross-laboratory study on analytical variability of amino acid content in three insect species. 70th Annual Meeting of the European Federation of Animal Science, Ghent, Belgium.
5. ³Hays, S., P. Teel, S. Swiger, T. Hairgrove, D. Anderson, and **J.K. Tomberlin**. 2019. Economic assessment of working cattle and technology adoption in grazing cattle. Southwestern Entomological Society of America Conference, Tulsa, Oklahoma.
6. Tarone, A.M., and **J.K. Tomberlin**. 2019. Necrobiome Research at Texas A&M University. Center for Advanced Research in Forensic Science, American Academy of Forensic Sciences Conference, Baltimore, Maryland.
7. Hobby, S., P. Delclos, **J.K. Tomberlin**, and M. Toews. 2018. Aflatoxin suppression

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- in stored corn by managing maize weevils and introducing an exogenous molecule. National: Entomological Society of America, Vancouver, Canada.
- 8.⁵Oliveira, J.S., A.F. Spindola², and **J.K. Tomberlin**. 2018. Copula duration of black soldier fly: Impact on female fertility and larval production. Eating Insects Conference, Athens, Georgia.
 - 9.³Limon, V., J.A. Aitkenhead-Peterson, M. Smith, C. Speights, B. Barton, M. Lashley, H. Jordan, **J. Tomberlin**, J. Mowrer, and A.P. Schwab. 2018. Effect of mass mortality events on water extractable soil nutrients. Ecological Society of America Conference. New Orleans, Louisiana.
 10. Sanit, S., K. Limsopatham, T. Klong-Klaew, C. Samerjai, T. Yasanga, K. Sukontason, **J. Tomberlin**, and K. Sukontason. 2018. Species identification of blow flies of the genus *Hypopygiopsis*. 5th European Congress of Conservation Biology, Jyväskylä, Finland.
 11. Sare, L., S. Bankston, and **J.K. Tomberlin**. 2018. Developing an information literacy-intensive forensic science course. American Academy of Forensic Sciences. Seattle, Washington.
 12. Shockley, M., A. Fonseca Muñoz, L.R. Bautista, P.A.F. Rios, **J.K. Tomberlin**, and R. Perez Pacheco. 2016. Cultural and economic uses of insects in Oaxaca, Mexico. International Congress of Entomology. Orlando, Florida.
 13. Fonseca Muñoz, A., H.E. Sarmiento Jimenez, **J.K. Tomberlin**, R. Perez Pacheco, L.R. Bautista. 2016. Maggot debridement therapy for a case of Fournier's gangrene. International Congress of Entomology. Orlando, Florida.
 14. ⁴Dell, Z., **J.K. Tomberlin**, and P.D. Teel. 2015. Applications of near-infrared reflectance spectroscopy to estimate post mortem interval. Undergraduate Research Week, Texas A&M University. College Station, Texas.
 15. ¹Owings C.G., C.J. Picard, **J.K. Tomberlin**, A.M. Tarone, and C. Spiegelman. 2015. Phenotypic plasticity of *Cochliomyia macellaria* Fabricius (Diptera: Calliphoridae) populations in Texas. Women in STEM Research Poster Session; 2015 March 27; Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, Indiana.
 16. ¹Owings C.G., C.J. Picard, **J.K. Tomberlin**, A.M. Tarone, and C. Spiegelman. 2015. Phenotypic plasticity of *Cochliomyia macellaria* Fabricius (Diptera: Calliphoridae) populations in Texas. 130th Annual Indiana Academy of Science Meeting, Indianapolis, Indiana.
 17. ³Weidner, L.M., G.C. Hamilton, and **J.K. Tomberlin**. 2012. Distribution and biodiversity of blow flies (Diptera: Calliphoridae) throughout New Jersey. National Entomological Society of America Conference. Knoxville, Tennessee.
 18. ²Pimsler, M.L., C.G. Owings¹, B. O'Connor, A.M. Tarone, and **J.K. Tomberlin**. 2012. New mite species described in human death investigation: implications for forensic entomology and decomposition ecology. National Entomological Society of America Conference. Knoxville, Tennessee.
 19. ³Weidner, L., G. Hamilton, and **J.K. Tomberlin**. 2012. Distribution and biodiversity of blow flies (Diptera:

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- Calliphoridae) throughout New Jersey. 10th Annual North American Forensic Entomology Conference, Las Vegas, Nevada.
20. ²Heo, C.C., B. Latif, S. Aisyah, H. Kurahashi, and **J.K. Tomberlin**. 2012. Description of third instar larvae of *Boettcherisca highlandica* Kurahashi & Tan, 2009 (Diptera: Sarcophagidae): a highlander of forensic importance in Malaysia. 11th Annual College of Pathologists, Academy of Medicine of Malaysia. Kuala Lumpur, Malaysia.
 21. ²Mohr, R., and **J.K. Tomberlin**. 2011. Physiological development and environmental effects on carcass attendance by *Cochliomyia macellaria* (Diptera: Calliphoridae) and *Chrysomya rufifacies* (Diptera: Calliphoridae). North American Forensic Entomology Association, College Station, Texas.
 22. ⁴Diaz, M., M. Flores², S. Anderson, and **J.K. Tomberlin**. 2010. Society for the Advancement of Chicanos and Native Americans in Sciences National Conference, Anaheim, California.
 23. ⁴Vaughn, M., **J.K. Tomberlin**, and E.B. Mondor 2010. Arrival and colonization patterns of flies (Diptera: Calliphoridae) of forensic importance, to estimate post-mortem intervals in southern Georgia pine forests. College of Undergraduate Research Symposium, Georgia Southern University, Statesboro, Georgia.
 24. ⁴Vaughn, M., **J.K. Tomberlin**, and E.B. Mondor 2010. Arrival and colonization patterns of flies (Diptera: Calliphoridae) of forensic importance, to estimate post-mortem intervals in southern Georgia pine forests. Southeastern Ecology and Evolution Conference, Georgia Institute of Technology, Atlanta, Georgia.
 25. ¹Cammack, J.A. P.H. Adler, **J.K. Tomberlin**, Y. Arai, and W.C. Bridges, Jr. 2009. Parasitoids and Forensic Entomology: Friend or Foe? 2nd NCSU Forensic Science Symposium. Raleigh, North Carolina.
 26. ³Amatya, Prasant, M. Yu, **J.K. Tomberlin**, and F. Ewell. 2008. Benefit-cost analysis of using black soldier fly in dairy waste management. 6th Annual Pathways Student Research Symposium, Texas A&M System. Commerce, TX.
 27. ¹McClellan, P., **J.K. Tomberlin**, and D. Kattes. 2008. Insecticide resistance in house flies, *Musca domestica*, populations in four dairies in central Texas, USA. 7th Annual Graduate Student Symposium, Tarleton State University, Stephenville, Texas.
 28. ¹McClellan, P., **J.K. Tomberlin**, and D. Kattes. 2008. Insecticide resistance in house flies, *Musca domestica*, populations in four dairies in central Texas, USA. Southwestern Branch: Entomological Society of America. Fort Worth, Texas.
 29. ¹McClellan, P., **J.K. Tomberlin**, and D. Kattes. 2007. Insecticide resistance in house flies, *Musca domestica*, populations in four dairies in central Texas, USA. 5th Annual Student Research Symposium: Pathways to the Doctorate. Tarleton State University, Stephenville, Texas.
 30. ⁴Littlefield, K., **J.K. Tomberlin**, and B. Lambert 2007. Condensed tannins inhibit house fly development in livestock manure. 5th Annual Student Research

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Symposium: Pathways to the Doctorate. Tarleton State University, Stephenville, Texas.

31. Keck, M., K. Scholfield, **J.K. Tomberlin**, P. Porter, and M. Merchant. 2006. Elementary insects: urban entomology education for youth. National: Entomological Society of America. Indianapolis, Indiana.
32. Hambley, J., G. Schuster, M. Brown, C. Pounce, J. Talley, D. Britten, and **J.K. Tomberlin**. 2006. Efficacy of diflubenzuron, an insect growth regulator, for control of stable flies (Diptera: Muscidae) in confined feeding dairy facilities. Livestock Insect Workers Conference. Amarillo, Texas.
33. Albert M., J.K. Tomberlin, and C. Johnson. 2006. Observations of decomposition in southern coastal North Carolina. American Academy of Forensic Sciences. Seattle, Washington.
34. Hambley, J., G. Schuster, M. Brown, C. Pounce, J. Talley, D. Britten, and **J.K. Tomberlin**. 2006. Efficacy of diflubenzuron, an insect growth regulator, for control of stable flies (Diptera: Muscidae) in confined feeding dairy facilities. Science Conference, Texas A&M University, College Station, Texas.
35. **Tomberlin, J.K.** and D.C. Sheppard. 2000. House fly colonization of media inoculated with black soldier fly larvae. National: Entomological Society of America. Montreal, Canada.
36. **Tomberlin, J.K.**, D.C. Sheppard, and J. Joyce. 2000. Susceptibility of black soldier fly, *Hermetia illucens* (L.), larvae to pyriproxyfen and cyromazine: Implications for integrated pest management in livestock. Southeastern Branch: Entomological Society of America. Mobile, Alabama.
37. Joyce, J., **J.K. Tomberlin**, and D.C. Sheppard. 1999. Lekking behavior of the black soldier fly, a beneficial insect for waste management. National: Entomological Society of America. Atlanta, Georgia.
38. Sheppard, C., **J.K. Tomberlin**, and G.L. Newton. 1998. Use of soldier fly larvae to reduce manure, control house fly larvae, and produce high quality feedstuff. National: Poultry Waste Management Symposium. Springdale, Arkansas.
39. Goff, M.L. and **J.K. Tomberlin**. 1997. Comparison of the efficiency of four different collecting techniques for species of *Dyscritomyia* (Diptera: Calliphoridae) endemic to the Hawaiian Islands. National: Entomological Society of America. Nashville, Tennessee.

INVITED PRESENTATIONS

1. **Tomberlin, J.K.** 2020. Engineering the black soldier fly for mass production. Georgia Tech, Atlanta, Georgia.
2. **Tomberlin, J.K.** 2020. Microbe-insect interactions: importance for forensic entomology and decomposition ecology. Lawrence Livermore National Laboratory, Livermore, California.
3. **Tomberlin, J.K.** 2019. Harvesting death for humanity's benefit. Green Veterinarians, Texas A&M University.
4. **Tomberlin, J.K.** 2019. Harvesting death for humanity's benefit. Pecan Grower's Board Meeting, College Station, Texas.
5. Bosch, G. G.G.A.B. Oonincx, H.R. Jordan, J. Zhang, J.J.A. Van Loon, A. Van Huis, and **J.K.**

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- Tomberlin.** 2019. Resource conversion by black soldier fly larvae: Towards standardization of methods and reporting. 70th Annual Meeting of the European Federation of Animal Science, Ghent, Belgium.
6. **Tomberlin, J.K.** 2019. Insects as Food & Feed Industry: \$70B by 2030. 1st Conference on Insects as Food and Feed in Africa. Harare, Zimbabwe.
 7. **Tomberlin, J.K.** 2019. Black soldier fly: What we know and don't know. 1st Conference on Insects as Food and Feed in Africa. Harare, Zimbabwe.
 8. **Tomberlin, J.K.,** and T.L. Crippen. 2018. Interkingdom communication regulates mosquito attraction to hosts: Linking microbial ecology with insect behavior. National: Entomological Society of America, Vancouver, Canada.
 9. **Tomberlin, J.K.** 2018. Application of the black soldier fly in aquaculture. Puerto Montt, Chile.
 10. **Tomberlin, J.K.** 2018. Black soldier fly production: From basic to applied. EAWAG, Zurich, Switzerland.
 11. **Tomberlin, J.K.** 2018. Bridging basic and applied research with the black soldier fly. ETH, Zurich, Switzerland.
 12. **Tomberlin, J.K.** 2018. Understanding the biology of the black soldier fly and its applications. Wageningen University, Wageningen, Netherlands.
 13. **Tomberlin, J.K.,** J.A. Cammack⁶, S. Yang², and H.R. Jordan. 2018. A triangulated foundation to promote efficient and safe production of the black soldier fly at an industrial scale. Insects
 - Feed the World Conference, Wuhan, China.
 14. ⁶Cammack, J.A., and **J.K. Tomberlin.** 2018. The nature of nutrition. Insects as Food and Feed Symposium, Indiana University-Purdue University at Indianapolis, Indiana.
 15. **Tomberlin, J.K.** 2018. Current and future prospects of insects as food and feed. Insects as Food and Feed Symposium, Indiana University-Purdue University at Indianapolis, Indiana.
 16. Carter, D.O., and **J.K. Tomberlin.** 2018. Advances in forensic microbiology. Workshop: Think tank on the leading edge of forensic science: Drones, autonomous vehicles, big data/big problems, national security globalization into protrusionism privacy, dirty bombs, and microbial forensics. American Academy of Forensic Sciences, Seattle, Washington.
 17. **Tomberlin, J.K.** 2017. Forensic entomology. Medical and Veterinary Entomology (ENTOM 3520). Department of Entomology, Cornell University, Ithaca, New York.
 18. **Tomberlin, J.K.** 2017. Harvesting death for humanity's benefit. Forensic Science Program, University of North Texas Health Science Center, Ft. Worth, Texas.
 19. **Tomberlin, J.K.** 2017. Forensic entomology. Survey of Forensic Science, CHS3501. Florida International University, Miami, Florida.
 20. **Tomberlin, J.K.,** C. Holcomb², B. Jones², and J.A. Cammack⁶. 2017. Tinkering with black soldier fly biology to produce a more efficient industry.

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National: Entomological Society of America, Denver, Colorado.

Branch: Entomological Society of America, Austin, Texas.

21. ⁶Cammack, J.A., J. Pechal, S. Sweet, T. Crippen, A. Knap, M.E. Benbow, and **J.K. Tomberlin**. 2017. Insects and microbes drive VOC emission from decomposing carrion resources. National: Entomological Society of America, Denver, Colorado.
22. **Tomberlin, J.K.** 2017. Creating a novel global industry with the black soldier fly. Southwestern Branch: Entomological Society of America, Austin, Texas.
23. ²Yang, F., H.R. Jordan, and **J.K. Tomberlin**. 2017. Associated bacteria community in black soldier fly (Diptera: Stratiomyidae) larvae shift in response to host starvation. Southwestern Branch: Entomological Society of America, Austin, Texas.
24. ²Spindola, A., J.D. Oswald, and **J.K. Tomberlin**. 2017. Morphology of the male reproductive tract and sperm of the adult black soldier fly (Diptera: Stratiomyidae): Implications for adult colony maintenance. Southwestern Branch: Entomological Society of America, Austin, Texas.
25. ¹Beskin, K., and **J.K. Tomberlin**. 2017. The impact of larval digestion of different manure types by the black soldier fly, *Hermetia illucens*, (L.) (Diptera: Stratiomyidae) on volatile emissions. Southwestern Branch: Entomological Society of America, Austin, Texas.
26. ³Cammack, J., and **J.K. Tomberlin**. 2017. Using nutrition ecology to build a better black soldier fly. Southwestern
27. ²Holcomb, C., and **J.K. Tomberlin**. 2017. Rearing insects for innovative feed production: Development of the black soldier fly, *Hermetia illucens* (L.) (Diptera: Stratiomyidae) and house fly, *Musca domestica* (L.) (Diptera: Muscidae) on three manure types. Southwestern Branch: Entomological Society of America, Austin, Texas.
28. ²Jones, B., and **J.K. Tomberlin**. 2017. Impact of larval competition on survivorship of the black soldier fly, *Hermetia illucens* (Diptera: Stratiomyidae). Southwestern Branch: Entomological Society of America, Austin, Texas.
29. **Tomberlin, J.K.**, and H.R. Jordan. 2016. Impact of bacteria on behavior of blow flies: Implications for forensic entomology. International Conference on Entomology, Pujabi University, Patiala, India.
30. Jordan, H.R., and **J.K. Tomberlin**. 2016. Insights from studies of the ecology and transmission of *Mycobacterium ulcerans* and Buruli Ulcer disease. International Conference on Entomology, Pujabi University, Patiala, India.
31. **Tomberlin, J.K.** 2016. Potential solutions for optimizing mass-production of black soldier fly larvae. 2nd International Symposium on Organic Waste Bioconversion and Applications by Microbes and Insects & Microbiology Frontier Forum. Huazhong Agricultural University, Wuhan, China.
32. **Tomberlin, J.K.**, T.L. Crippen, and J.A. Cammack. 2016. Tri-trophic

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- interactions mediating arthropod behavior on decomposing vertebrate carrion. International Congress of Entomology. Orlando, Florida.
33. **Tomberlin, J.K.** 2016. Tales from the crypt: Harvesting death for humanity's benefit. Department of Entomology, University of Georgia, Athens, Georgia.
 34. **Tomberlin, J.K.** 2016. Environmental profiting from decomposition: Tales of an entomologist. Eating Insects Detroit. Wayne State University, Detroit, Michigan.
 35. **Tomberlin, J.K.** 2016. Tales from the crypt: Harvesting death for humanity's benefit. TEDx TAMU. Texas A&M University, College Station, Texas.
 36. **Tomberlin, J.K.** 2016. Using the black soldier fly to recycle wastes. Manure Entomology: Manure Management that Won't 'Bug' You. Livestock and Poultry Environmental Learning Center.
 37. **Tomberlin, J.K.** 2016. Public information regulates arthropod community interactions and nutrient recycling of vertebrate carrion. Department of Biology, Mississippi State University, Starkville, Mississippi.
 38. ⁶Cammack, J.A. and **J.K. Tomberlin**. 2015. Black soldier fly, *Hermetia illucens* (L.) as a model system for waste reduction and feed production: Accomplishments and future hurdles. Entomological Society of America, 63rd Annual Meeting, Minneapolis, Minnesota.
 39. **Tomberlin, J.K.** 2015. Harvesting death for humanity's benefit. Wolfson College, University of Cambridge, Cambridge, United Kingdom.
 40. **Tomberlin, J.K.** 2015. From ecosystem to individual: Quorum sensing as a mechanism regulating behaviour. Department of Zoology, Oxford University, Oxford, United Kingdom.
 41. **Tomberlin, J.K.** 2015. Microbial quorum sensing as a mediator of ecosystem behavior. Liverpool School of Tropical Medicine, Liverpool, United Kingdom.
 42. **Tomberlin, J.K.** 2015. Microbial whispers regulate resiliency within ephemeral resources. Behavioral Ecology Luncheon, Department of Zoology, University of Cambridge, Cambridge, United Kingdom.
 43. **Tomberlin, J.K.** 2015. Harvesting death for uses in forensics and agriculture: The tales of a decomposition ecologist. Department of Entomology, Michigan State University, Lansing, Michigan.
 44. **Tomberlin, J.K.** 2014. Legal aspects of forensic entomology in the criminal justice system in the United States. Corso di Perfezionamento in Anthropologia e Odontologia Forense l'Identificazione. Naples, Italy.
 45. **Tomberlin, J.K.** 2014. Behavior of food web dynamics regulated by quorum sensing: New frontier in forensic entomology. Department of Entomology, University of Arkansas, Fayetteville, Arkansas.
 46. ²Pimsler, M.L., S.-H. Sze, C.D. Jones, M.J. Scott, S. Fu, C.J. Picard, A.A. Andere, **J.K. Tomberlin**, and A. M. Tarone 2014. Transcriptomics to investigate sex determination and sexual dimorphism in *Chrysomya rufifacies*

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- (Diptera: Calliphoridae). International Symposium on Organic Waste Bioconversion Mechanism and Applications by Microbes and Insects, Chinese Entomological Society of China, Huazhong Agricultural University, Wuhan, China.
47. ²Pimsler, M.L., S.-H. Sze, C.D. Jones, M.J. Scott, S. Fu, C.J. Picard, A.A. Andere, **J.K. Tomberlin**, and A. M. Tarone. 2014. Transcriptomics and sex determination in *Chrysomya rufifacies*. Guest Lecture, Ziejiang University, Huangzhou, China.
 48. **Tomberlin, J.K.** T.L. Crippen, M.E. Benbow, A.M. Tarone, and T.K. Wood. 2014. Quorum sensing regulates arthropod behavior. College of Agricultural and Biotechnology, Zhejiang University, Huangzhou, China.
 49. **Tomberlin, J.K.** T.L. Crippen, M.E. Benbow, A.M. Tarone, and T.K. Wood. 2014. Quorum sensing regulates arthropod behavior. State Key Laboratory of Agricultural Microbiology, Huazhong Agricultural University, Wuhan, China.
 50. **Tomberlin, J.K.** T.L. Crippen, M.E. Benbow, A.M. Tarone, and T.K. Wood. 2014. Quorum sensing regulates arthropod behavior. Northwest Agricultural and Forestry University, Xian, China.
 51. **Tomberlin, J.K.** T.L. Crippen, M.E. Benbow, A.M. Tarone, and T.K. Wood. 2014. Quorum sensing regulates arthropod behavior. College of Plant Protection, Shandong Agricultural University, Jinan, China.
 52. **Tomberlin, J.K.** T.L. Crippen, M.E. Benbow, A.M. Tarone, and T.K. Wood. 2014. Quorum sensing regulates arthropod behavior. China Agricultural University, Beijing, China.
 53. **Tomberlin, J.K.** 2014. Black soldier fly biology and applications. 2nd International Symposium on Organic Waste Bioconversion Mechanisms and Applications by Microbes and Insects. Wuhan, China.
 54. **Tomberlin, J.K.** 2014. Forensic entomotoxicology. Forensic Sciences and Criminal Behaviour Conference, Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal.
 55. **Tomberlin, J.K.** 2014. Microbial quorum sensing regulates behavior in arthropods: Bridging basic and applied research in forensics. Department of Entomology, Rutgers University.
 56. **Tomberlin, J.K.** 2014. Forensic entomology: The hidden witness. 68th Texas A&M University Urban Pest Management Conference and Workshop. College Station, Texas.
 57. **Tomberlin, J.K.** 2013. Quorum sensing of bacteria regulates arthropod behavior: Bridging Sciences in Forensics. Department of Entomology, Purdue University.
 58. **Tomberlin, J.K.** 2013. Bacteria-blow fly interactions: bridging basic and applied research in forensic entomology. Entomological Society of America, Austin, Texas.
 59. **Tomberlin, J.K.** 2013. Blow fly predator-prey interactions mediated by microbes: implications in forensics and vertebrate carrion ecology. Entomological Society of America, Austin, Texas.

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60. Crippen, T.L., **J.K. Tomberlin**, L. Zheng⁵, B. Singh⁶, A.M. Tarone, and M.L. Pimsler². 2013. Bacteria living with and talking to the black soldier fly. Entomological Society of America, Austin, Texas.
61. Anderson, G., **J.K. Tomberlin**, V. Cervenka, and J.R. Wallace. 2013. American Board of Forensic Entomology: Opportunities to bridge with the North American Forensic Entomology Association. North American Forensic Entomology Association Conference, Dayton, Ohio.
62. **Tomberlin, J.K.** and A.M. Tarone. 2013. Forensic entomology at Texas State University: what the insects are telling us. Texas State University.
63. **Tomberlin, J.K.** 2013. Black soldier flies as a means for waste management and alternate protein production. Institute for Economic and Community Development, Clemson University.
64. **Tomberlin, J.K.** 2013. Quorum sensing by bacteria regulates interkingdom interactions on vertebrate carrion: a new frontier for forensics. School of Agricultural, Forest, and Environmental Sciences, Clemson University.
65. **Tomberlin, J.K.** 2013. Bridging entomology and microbiology: a new frontier in forensics. UNICAMP, Universidade Estadual de Campinas.
66. **Tomberlin, J.K.** 2013. New frontiers in forensic entomology. Forensic Sciences and Criminal Behaviour Conference, Instituto Superior de Ciencias da Saude Egas Moniz, Lisbon, Portugal.
67. **Tomberlin, J.K.** 2012. Contributions of the National Research council report on forensics to medico-legal entomology. National Entomological Society of America Conference. Knoxville, Tennessee.
68. **Tomberlin, J.K.** and M. Flores. 2012. Behavioral data analysis: from χ^2 to Cochran-Mantel-Haenzel and binary logistic regression. National Entomological Society of America Conference. Knoxville, Tennessee.
69. **Tomberlin, J.K.**, and M.L. Pimsler. 2013. Use of black soldier flies to reduce waste and produce alternate protein. London School of Tropical Medicine and Hygiene, London, United Kingdom.
70. **Tomberlin, J.K.**, and M.L. Pimsler². 2013. Forensic entomology. Charterhouse, Godalming, United Kingdom.
71. Crippen, T.C., C.L. Sheffield, L. Zheng⁵, J.F. Esquivel, T.L. Poole, and **J.K. Tomberlin**. 2012. Beetles, bacteria and broilers: An arena for pathogen dispersal. National Entomological Society of America Conference. Knoxville, Tennessee.
72. Benbow, M.E., **J.K. Tomberlin**, T.L. Crippen, A.M. Tarone, T. Wood, H.N. LeBlanc, and J.L. Pechal². 2012. Microbes, maggots and multiplicity: biotic and abiotic complexities of carrion decomposition. National Entomological Society of America Conference. Knoxville, Tennessee.
73. Tarone, A.M., T.L. Crippen, L. Zheng⁵, A. Fields, Q. Ma, T. Wood, S.E. Dowd, M. Flores², and **J.K. Tomberlin**. 2012. Behavioral and community analyses of bacteria associated with *Lucilia* species.

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- National Entomological Society of America Conference. Knoxville, Tennessee.
74. ²Pechal, J.L., M.E. Benbow, T.L. Crippen, A.M. Tarone, and **J.K. Tomberlin**. 2012. Bacteria and blow fly interactions throughout vertebrate decomposition. National Entomological Society of America Conference. Knoxville, Tennessee.
 75. ⁶Singh, B., T.L. Crippen, A.M. Tarone, M.E. Benbow, L. Zheng⁵, Z. Yu, A.L. Brundage², A. Fields, M. Flores², T. Wood, and **J.K. Tomberlin**. 2012. Bacterial diversity associated with flies of forensic importance. National Entomological Society of America Conference. Knoxville, Tennessee.
 76. **Tomberlin, J.K.** 2012. Interkingdom eavesdropping as a mechanism governing arthropod behavior. Department of Biology, Sam Houston University, Huntsville, Texas.
 77. **Tomberlin, J.K.** 2012. Behavioral echoes of blow flies (Diptera: Calliphoridae) associated with resource pulses. Department of Biology, St. Edwards University, Austin, Texas.
 78. **Tomberlin, J.K.** 2012. New trends in forensic entomology. 75th Texas International Association for Identification. Galveston, Texas.
 79. **Tomberlin, J.K.** 2012. Interkingdom eavesdropping explains arthropod behavior. Ecolunch, Section of Integrative Biology, University of Texas.
 80. **Tomberlin, J.K.** 2012. Analysis of behavioral data. 2012 Probability and Statistics Day. Department of Statistics, Texas A&M University.
 81. **Tomberlin, J.K.**, M. Flores, & J. Pechal. 2012. Forensic entomology workshop. San Antonio Police, San Antonio, Texas.
 82. **Tomberlin, J.K.** 2011. Forensic entomology. Forensic Sciences, St. Edwards University, Austin, Texas.
 83. ²Pechal, J.L., M.E. Benbow, T.L. Crippen, A.M. Tarone, and **J.K. Tomberlin**. 2011. Community composition and assembly on decomposing vertebrate carcasses using pyrosequencing. Entomological Society of America Conference, Reno, Nevada.
 84. **Tomberlin, J.K.** 2011. Highlights of veterinary entomology. Entomological Society of America Conference, Reno, Nevada.
 85. **Tomberlin, J.K.** 2011. Behavioral echoes of saprophytic dipteran ecology-how is that related to forensics? Department of Biology, University of Texas, Tyler, Texas.
 86. **Tomberlin, J.K.** 2011. Forensic entomology for writers. Brazos Writers Association. College Station, Texas.
 87. **Tomberlin, J.K.** 2011. An update on black soldier fly research. Huazhong Agricultural University, Wuhan, China.
 88. **Tomberlin, J.K.**, M.E. Benbow, T. Crippen, A. Tarone, H. LeBlanc, and T. Wood. 2011. Microbial puppet masters of blow fly behavior. Huazhong Agricultural University, Wuhan, China.

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89. **Tomberlin, J.K.**, M.E. Benbow, T. Crippen, A. Tarone, H. LeBlanc, and T. Wood. 2011. Forensic entomology: past, present and future. International Conference on Forensic Entomology, Guangzhou Police College, Guangzhou, China.
90. **Tomberlin, J.K.** 2011. An update on black soldier fly research. International Conference on Forensic Entomology, Guangzhou Police College, Guangzhou, China.
91. **Tomberlin, J.K.** 2011. An update on black soldier fly research. Zhuhai Research Center of Agriculture and Science, Zhuhai, China.
92. **Tomberlin, J.K.**, M.E. Benbow, T. Crippen, A. Tarone, H. LeBlanc, and T. Wood. 2011. Keynote: Forensic entomology: past, present and future. Universiti Teknologi Mara, Kuala Lumpur, Malaysia.
93. **Tomberlin, J.K.** 2011. Keynote: Case studies in forensic entomology. Universiti Teknologi Mara, Kuala Lumpur, Malaysia.
94. Benbow, M.E., **J.K. Tomberlin**, A.M. Tarone, T.L. Crippen, T.K. Wood, H. LeBlanc. 2011. Understanding the mechanistic role of blow flies in the microbial ecology of carrion decomposition: implications to food borne disease spread. One Day Workshop "Forensic Entomology and It's Implications in Medicine". Universiti Teknologi Mara, Kuala Lumpur, Malaysia.
95. Benbow, M.E., **J.K. Tomberlin**, A.M. Tarone, T.L. Crippen, T.K. Wood, H. LaBlanc. 2011. New approaches for understanding the mechanistic role of microbial community-blow fly interactions during carrion decomposition: applications to forensic science. Department of Forensic Science and Technology, Guangdong Police College, Guangzhou, China.
96. Benbow, M.E., **J.K. Tomberlin**, A.M. Tarone, TL Crippen, TK Wood, H LaBlanc. 2011. Understanding the mechanistic role of blow flies in the microbial ecology of carrion decomposition: implications to food borne disease spread. Zhuhai Agricultural Center, Zhuhai, China.
97. Benbow, M.E., **J.K. Tomberlin**, A.M. Tarone, T.L. Crippen, T.K. Wood, H. LeBlanc. 2011. Blow flies, bacteria and inter-kingdom ecological interactions during decomposition: implications for forensic science and beyond. Invited Plenary Speaker for the Global Conference on Entomology, Chiang Mai, Thailand.
98. ¹Cammack, J.A., G.R. Balme, Y. Arai, **J.K. Tomberlin**, and D.W. Watson. 2011. The "dirt" on forensic entomology. 85th annual meeting of the Southeastern Branch, Entomological Society of America. Puerto Rico.
99. **Tomberlin, J.K.** 2011. Forensic entomology. Forensic & Investigative Sciences Organization, Sam Houston University, Huntsville, Texas.
100. Benbow, M.E., **J.K. Tomberlin**, J.L. Pechal, T. Crippen, A.M. Tarone, T. Wood, A. Lewis. July 2011. Understanding the mechanistic role of blow flies in the microbial ecology of carrion decomposition: implications to food borne disease spread. Seminar,

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Faculty of Medicine, University
Teknologi Mara, Malaysia.

101. **Tomberlin, J.K.**, T. Crippen, M.E. Benbow, A. Tarone, T. Wood, Q. Ma, M. Flores, A. Fonseca, and A. Spindola. July 2011. Carrion Community Ecology: An Emphasis on Microbial Regulation of Blow Fly Behavior. Seminar, Faculty of Medicine, Universiti Teknologi Mara, Malaysia.
102. **Tomberlin, J.K.** 2011. Using the black soldier fly to convert animal and human wastes to livestock feedstuff: a case example. Texas Aquaculture Association Annual Conference, Bay City, Texas.
103. ²Sanford, M.R., J.K. Olson, and **J.K. Tomberlin**. 2010. Non-consumptive effects and experience with mosquito-fish on mosquito larval development and adult oviposition site selection. Entomological Society of America Annual Meeting, San Diego, California.
104. Tarone, A., A. Fields, L. Zheng², **J.K. Tomberlin**, T. Crippen, Z. Yu, and T. Wood. 2010. Just how filthy are maggots? Microbes associated with the blow fly *Lucilia sericata* (Diptera: Calliphoridae). Athens Institute for Education and Research Agriculture. Athens, Greece.
105. **Tomberlin, J.K.**, A. Brundage, R. Mohr², M.E. Benbow, T. Crippen, and A. Tarone. 2010. Potential role of microbes regulating attraction and colonization of rendered animals by blow flies (Diptera: Calliphoridae). Athens Institute for Education and Research Agriculture. Athens, Greece.
106. Crippen, T., L. Zheng, C. Sheffield, and **J.K. Tomberlin**. 2010. Movement of bacteria through the gastrointestinal tract of the lesser mealworm, *Alphitobius diaperinus* (Coleoptera: Tenebrionidae), into the environment. Athens Institute for Education and Research Agriculture. Athens, Greece.
107. Benbow, M.E., A. Lewis, **J.K. Tomberlin**, T. Crippen, and H.N. LeBlanc. 2010. The influence of microbial succession on insect communities of swine carcasses: implications for potential pathogen dispersal from large animal feeding operations. Athens Institute for Education and Research Agriculture. Athens, Greece.
108. **Tomberlin, J.K.** 2010. Decomposition ecology and forensics. BICH 107/GENE 105. Department of Biochemistry, Texas A&M University.
109. **Tomberlin, J.K.** 2010. Learning life's lessons through forensic entomology. Beta Beta Beta Honor Society, Georgia Southern University, Statesboro, Georgia.
110. **Tomberlin, J.K.** 2010. Deciphering trophic interactions on carrion: a paradigm shift in forensic entomology. Department of Biology, Georgia Southern University, Statesboro, Georgia.
111. **Tomberlin, J.K.** and R. Mohr. 2010. The analysis of entomological evidence in criminal investigations. Association of Forensic DNA Analysts and Administrators. Austin, Texas.
112. **Tomberlin, J.K.** and R. Mohr. 2010. Forensic entomology. 2010. Texas Division of the International Association of Identification, Austin, Texas.

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113. **Tomberlin, J.K.** 2010. Southern Region IPM: mosquito abatement and the evolution of a youth program. Southern Region IPM Center Advisors Conference, Raleigh, North Carolina.
114. **Tomberlin, J.K.** 2010. Trophic level interactions on ephemeral resources: a potential paradigm shift in forensic entomology. North Central Branch: Entomological Society of America, Louisville, Kentucky.
115. **Tomberlin, J.K.** 2010. The use of entomology in criminal investigations. Department of Forensic Sciences, Ontario Institute of Technology, Oshawa, Canada.
116. **Tomberlin, J.K.** 2010. A trophic level chess match in forensic ecology: a paradigm shift in forensic entomology. Department of Forensic Sciences, Ontario Institute of Technology, Oshawa, Canada.
117. **Tomberlin, J.K.** 2010. Trophic level warfare and its role in ecological forensics: a future for biological sensors. Department of Entomology, University of Georgia, Athens, Georgia.
118. **Tomberlin, J.K.** 2010. Understanding trophic interactions on carrion results in paradigm shift in forensic entomology: insects, microbes and biosensors. Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, Oklahoma.
119. **Tomberlin, J.K.** 2010. Arthropods associated with poultry. Poultry Science 309, Department of Poultry Science, Texas A&M University, College Station, Texas.
120. **Tomberlin, J.K.** 2009. The future of biosensors in forensic investigations. Department of Biology, University of Dayton, Dayton, Ohio.
121. **Tomberlin, J.K.** and R. Mohr. 2009. Entomotoxicology. Southwestern Association of Toxicologists. San Antonio, Texas.
122. ²Sanford, M.R., **J.K. Tomberlin**, and J.K. Olson. 2009. Appetitive olfactory-based associative learning in *Culex quinquefasciatus*: how long does a mosquito remember? Society of Vector Ecology Annual Meeting. Antalya, Turkey.
123. **Tomberlin, J.K.** 2009. Black soldier fly research in the 21st century. Spice and Beverage Research Institute, Hainan, China.
124. **Tomberlin, J.K.** 2009. Using nature for sustainable waste management. Zhuhai Research Center of Agriculture and Science, Zhuhai, China.
125. **Tomberlin, J.K.** 2009. Bridging black soldier fly research in the United States and China. Department of Microbiology, Huazhong Agricultural University, Wuhan, China.
126. **Tomberlin, J.K.** 2009. The future of basic research in forensic entomology. Medical Sciences, Naresuan University, Phitsanulok, Thailand.
127. **Tomberlin, J.K.** 2008. Estudio de casos forenses. XXV Semana del Parasitólogo, Departamento de Parasitología, La Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico.

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128. ²Sanford, M.R., P. Somboon, **J.K. Tomberlin**, and J.K. Olson. 2008. Olfactory learning by malaria vectors in Thailand. Department of Parasitology, Chiang Mai University. Chiang Mai, Thailand.
129. **Tomberlin, J.K.** 2008. Estudio de casos. Taller Internacional en Entomología Forense, La Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico.
130. **Tomberlin, J.K.** 2008. Análisis de interval post mortem. Taller Internacional en Entomología Forense, La Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico.
131. **Tomberlin, J.K.** 2008. Forensic entomology at Texas A&M University: Smart insects, cow dung, and decomposition. National: Entomological Society of America. Reno, Nevada.
132. **Tomberlin, J.K.** 2008. Forensics and law. Integrated Pest Management Specialist Retreat. Agrilife Extension Service, Texas A&M University, New Braunsfel, Texas.
133. **Tomberlin, J.K.** 2008. Do female mosquitoes make oviposition decisions based on larval experience? Department of Parasitology, Faculty of Medicine, Chiang Mai University. Chiang Mai, Thailand. Presented by Ms. Michelle Sanford.
134. **Tomberlin, J.K.** 2008. Forensic entomology at Texas A&M University: Dung, Smart Insects, and Decomposition. Entomological Society of America. Reno, Nevada.
135. **Tomberlin, J.K.** 2008. Insecticide resistance in urban house fly populations. 62nd Texas A&M University Urban Pest Management Conference & Workshop. College Station, Texas.
136. **Tomberlin, J.K.** 2007. Forensic entomology at Texas A&M University. Department of Entomology, Soils, and Plant Pathology, Clemson University. Clemson, South Carolina.
137. **Tomberlin, J.K.** 2007. Opportunities for forensic entomology in Mexico. Semana Del Parasitologia XXIV. Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico.
138. **Tomberlin, J.K.** 2007. Forensic entomology. Texas Criminal Defense Lawyer's Association. 5th Annual Forensics Seminar. Dallas, Texas.
139. **Tomberlin, J.K.** 2007. Forensic entomology. Harris County Medical Examiner's Office. Houston, Texas.
140. Tomberlin, J.K. 2007. Forensic entomology. Department of Primary Industries and Fisheries. Brisbane, Australia.
141. Tomberlin, J.K. 2006. Insecticide resistance in resident house fly populations in restaurants and confined animal facilities. FMC Corporation: Pest Education Science and Technology Symposium. Phoenix, Arizona.
142. **Tomberlin, J.K.** 2006. Forensic entomology: From the 13th century to today. Southwestern Branch: Entomological Society of America. Austin, Texas.
143. **Tomberlin, J.K.** 2006. Goats, cows, and chickens: Is this really forensic entomology? North American Forensic

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- Entomology Conference. West Lafayette, Indiana.
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**EXTENSION TRAINING/ASSISTANCE
2006**

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I gave a total of 78 presentations at 35 events in 2006. Of those presentations, 61 were given at 28 extension events. The remaining 17 presentations were given at seven professional conferences held in the United States and Abroad. I gave presentations at extension and professional meetings in Texas, Indiana, Wisconsin, Arizona, and Nevada. Countries other than the United States where I gave presentations include Haiti, China, and Italy. The presentations can be broken down into the following categories, 1) Texas Cooperative extension (28 presentations), 2) Master Gardeners (3 presentations), 4-H (2 presentations), public schools and colleges (9 presentations), private organizations, international sites, and workshops (19 presentations), professional meetings (17 presentations). Approximately 2,300 individuals were present for these presentations.

2005

I continued to develop a livestock extension program with extension agents in District 8. I gave a total of 43 presentations in 2005 reaching over 2,800 individuals during extension events alone. The presentations can be broken down into the following categories, 1) Texas Cooperative extension (19 presentations), 2) Master Gardeners (1 presentation), 4-H (2 presentations), public schools (6 presentations), private organizations and workshops (4 presentations), professional meetings (11 presentations).

2004

I worked with all 26 agents within Texas District 8, as well as with agents in Texas Districts 3, 11, 5 and 7 on either one or more of the following items, insect identification, development and implementation of result-demonstrations, CEU training, and general public education. I gave a total of 76 presentations including the following, kid summer camp (2), master gardeners (6), master naturalists (4), beef and dairy cattle (5), decomposition ecology (16).

2003

I worked with all 26 agents within Texas District 8 on insect identification, development and implementation of result-demonstrations, CEU training, and general public education. I gave a total of 27 presentations including the following, kid summer camp (2), master gardeners (3), master naturalist (1), beef and dairy cattle (9), grasshoppers (4), fire ants (4), forensic entomology (4).

FORENSIC CASES (CONSULTANT)

Consulted on ~140 entomology-related in cases in Mexico, as well as North Carolina, South Carolina, Georgia, Kentucky, Arizona, Missouri, Oklahoma, New Mexico, Louisiana, Missouri, Massachusetts, Montana, Kentucky, Montana, and Texas.

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Rebuttal to Jeffrey D. Wells Report: An analysis of expert opinions offered by entomologists for the State of Nevada vs. Kristin Blaise LOBATO

I was asked to offer a response to statements made by Dr. Wells in his report with the aforementioned title. I have reviewed the scientific literature as related to his comments and offer the following responses to select statements made. It should be noted the pdf was converted to a word document for ease of copying and pasting exact language offered by Dr. Wells. Omissions or modifications were not intentional but due to transferring information from pdf to word document.

STATEMENT: Several published experiments with animal carcasses similarly demonstrated that blow flies did not immediately visit or deposit eggs on carrion even when environmental conditions appeared to be suitable for insect flight and location of the carrion. Two examples relevant to the expert testimony in *The State of Nevada vs. Kirstin Blaise Lobato* are summarized here.

RESPONSE: Blow flies (Diptera: Calliphoridae) are common and often identified as forensic evidence associated with decomposing remains. In the matter of *The State of Nevada vs. Kirstin Blaise Lobato* and with regards to Wells' examples provided, the arrival patterns associated with the two studies out of Texas, USA *were still within the window of time offered by the prosecution. Also, weather conditions experienced during the two studies out of Texas were similar to those recorded in the Lobato case.*

Furthermore, the discussion of forensic entomology as related to the case in question should not be limited to just blow flies. Arthropods associated with decomposing human remains, or other vertebrate remains, are quite diverse (Payne (1965) documented **522 species** representing 3 phyla, 9 classes, 31 orders, 151 families, and 359 genera associated with decomposing swine in South Carolina, USA).

In the case of *The State of Nevada vs. Kirstin Blaise Lobato*, it does not appear that *any* arthropods were observed in association with the decedent. Considering the amount of time (approximately 0300 hours until 2200 hours on July 8, 2001) the remains were alleged by the prosecution to be present at the recovery site, one would conclude some arthropod activity would have been observed. This conclusion is based on a tremendous amount of research documenting arthropod community diversity and arrival patterns of key arthropods across diverse habitats and seasons globally (see table 1). It also should be noted that Wells has published information indicating support of the premise that arthropods arrive quickly at carrion.

“Adults are extremely vagile and some species reach a carcass and oviposit within a few hours of death of the animal (Hall 1948).” Quote taken from Wells and Greenberg (1992).

Order: Family	Species	Arrival Post- Exposure	Location/ Season	Quote	Citation
Hymenoptera: Formicidae	<i>Solenopsis invicta</i>	Within 2 hours	Summer: August through October, Mississippi, USA	“Fire ants appeared on the control piglets within the first 2 h after exposure to the environment and accumulated in large numbers by 5–8 hours”	Meyer, F., M. D. Monroe, H. N. Williams, and J. Goddard. 2020. <i>Solenopsis invicta x richteri</i> (Hymenoptera: Formicidae) necrophagous behavior causes post-mortem lesions in pigs which serve as oviposition sites for Diptera. Forensic Science International: Reports 2: 100067.
Hymenoptera: Formicidae	<i>Solenopsis richteri</i>	Within 2 hours	Summer: August through October, Mississippi, USA	“Fire ants appeared on the control piglets within the first 2 h after exposure to the environment and accumulated in large numbers by 5–8 hours”	Meyer, F., M. D. Monroe, H. N. Williams, and J. Goddard. 2020. <i>Solenopsis invicta x richteri</i> (Hymenoptera: Formicidae) necrophagous behavior causes post-mortem lesions in pigs which serve as oviposition sites for Diptera. Forensic Science International: Reports 2: 100067.
Hymenoptera: Formicidae	<i>Solenopsis saevissima</i>	In the first hours	Summer: January and February, Universidade Federal do Maranhão, Brazil	“During stage S1, we found little odor caused by the decomposition of the carcasses and observed a low number of ants in the first hours of decomposition, mainly for the carcasses unexposed to the nests.”	Pereira, E. K. C., J. Andrade-Silva, O. Silva, C. L. C. Santos, L. S. Moraes, M. d. C. A. Bandeira, C. R. R. Silva, and J. M. M. Rebêlo. 2017. <i>Solenopsis saevissima</i> (Smith)(Hymenoptera: Formicidae) activity delays vertebrate carcass decomposition. Sociobiology 64: 369-372.
Hymenoptera: Formicidae	<i>Tetramorium semilaeve</i>	50 minutes	Summer: July, Calabria, Italy	“Fifty minutes after carcass placement, about 30 workers of <i>Tetramorium semilaeve</i> were observed on the eye rims of the pig.”	Bonacci, T., T. Zetto Brandmayr, P. Brandmayr, V. Vercillo, and F. Porcelli. 2011. Successional patterns of the insect fauna on a pig carcass in southern Italy and the role of <i>Crematogaster scutellaris</i>

					(Hymenoptera, Formicidae) as a carrion invader. Entomological Science 14: 125-132.
Hymenoptera: Formicidae	<i>Crematogaster scutellaris</i>	90 minutes		“One hour and a half after carcass placement, about 60 workers of <i>Crematogaster scutellaris</i> (Fig. 3a, b) were observed feeding on the eyes of the pig (Fig. 3c).”	Bonacci, T., T. Zetto Brandmayr, P. Brandmayr, V. Vercillo, and F. Porcelli. 2011. Successional patterns of the insect fauna on a pig carcass in southern Italy and the role of <i>Crematogaster scutellaris</i> (Hymenoptera, Formicidae) as a carrion invader. Entomological Science 14: 125-132.
Hymenoptera: Formicidae	<i>Trichomyrmex mayri</i>		Summer: May-July, Saudi Arabia, desert	“ <i>Trichomyrmex mayri</i> (Forel) was the only ant species attracted to the carcasses placed in the desert site” “In contrast, the desert site attracted the lowest number of ants” Temperatures for urban and desert sites were 40 to 45°C daily , respectively. Ants were collected at remains on day one at both locations.	Mashaly, A., M. R. Sharaf, M. Al-Subeai, F. Al-Mekhlafi, A. Aldawood, and G. Anderson. 2018. Ants (Hymenoptera: Formicidae) attracted to rabbit carcasses in three different habitats. Sociobiology 65: 433-440.
Diptera: Calliphoridae, Sarcophagidae		Within 24 hours	Spring: March, Texas	“On day one, the body was observed during burial at 1:30 PM and again at 4:30 and 9:00 PM. Initially, blowflies (Diptera: Calliphoridae) and fleshflies (Diptera: Sarcophagidae) were seen at the body. However, no feeding or oviposition was observed on or around the wound.”	Lindgren, N. K., S. R. Bucheli, A. D. Archambeault, and J. A. Bytheway. 2011. Exclusion of forensically important flies due to burying behavior by the red imported fire ant (<i>Solenopsis invicta</i>) in southeast Texas. Forensic Science International 204: e1-e3.
Diptera: Calliphoridae		2-3 hours	Spring-Fall: May, June, July, November, Tennessee, USA	“Adult blow flies were observed on the cadavers within 2 or 3 h after placement at the decay facility. Shortly afterwards the female blow flies were observed depositing eggs in the various facial cavities.”	W. Rodriguez and W. Bass, "Insect Activity and its Relationship to Decay Rates of Human Cadavers in East Tennessee," Journal of Forensic Sciences 28, no. 2 (1983): 423-432.
Diptera: Calliphoridae, Sarcophagidae			Spring, April: Arizona, USA	“By April, no sarcophagids were active from 9 a.m. to about one hour before sunset. Observations made early in the morning and at sunset showed that both species were very active during these periods but disappeared after 9 a.m.”	Burger J (1965) Studies on the succession of saprophagous Diptera on mammal carcasses in southern Arizona. MS Thesis, Univ Arizona

				<p>“During April, with increasing daytime temperatures, sarcophagids were active only in the early morning and just before sunset. <i>P. regina</i> and <i>P. sericata</i> were active when the sun was hottest from 9 a. m. to 5 p.m.”</p> <p>“Maggot activity was evident within 24 hours...”</p> <p>“From data collected during April at a mean maximum temperature of 90°F <i>H. plinthopyga</i> and <i>S. cessator</i> were the first to invade the fresh carcasses....”</p>	
Diptera: Calliphoridae, Sarcophagidae		5 minutes	Summer: July, Hawaii, USA	“Adult Calliphoridae and Sarcophagidae were the first insects to arrive, within 5 min of exposure to the carcasses.”	Hewadikaram, K. A., and M. L. Goff. 1991. Effect of Carcass Size on Rate of Decomposition and Arthropod Succession Patterns. The American Journal of Forensic Medicine and Pathology 12: 235-240.
Diptera: Calliphoridae		23 s to 4 min and 17 s	Summer: June-August, New Jersey, USA	“Initial blow fly arrival times ranged from 23 s to 4 min and 17 s, with mean (\pm SE) arrival times of 1:02 min \pm 21 s (R) and 2:40 min \pm 26 s (U) (Table 1).”	Weidner, L. M., M. A. Monzon, and G. C. Hamilton. 2016. Death eaters respond to the dark mark of decomposition day and night: observations of initial insect activity on piglet carcasses. International Journal of Legal Medicine 130: 1633-1637.
Diptera: Calliphoridae	<i>Cochliomyia macellaria</i>	10 minutes	Summer: South Carolina, USA	“Calliphorids, chiefly <i>Cochliomyia macellaria</i> , (F.), arrived at the pig within 10 min after placement and began feeding at the umbilical cord and mouth.”	Payne, J. A. 1965. A summer carrion study of the baby pig <i>Sus scrofa</i> Linnaeus. Ecology 46 592-602.
Diptera: Sarcophagidae		5 minutes	Summer: South Carolina, USA	“Within 5 minutes after the fresh-frozen pigs were placed on the nylon screens within each cage, sarcophagids were observed on the carcasses.”	Payne, J. A. 1965. A summer carrion study of the baby pig <i>Sus scrofa</i> Linnaeus. Ecology 46: 592-602.
Diptera: Calliphoridae, Sarcophagidae, Muscidae		Since the moment of death	Winter and Spring: Coahuila, Mexico	“Since the moment of death, adult flies belonging to the families Calliphoridae, Sarcophagidae, and Muscidae were noted overflying and on the carcasses.”	Valdes-Perezgasga, M.T., F.J. Sanchez-Ramos, O. Garcia-Martinez, and G.S. Anderson. 2010. Arthropods of forensic importance on pig carrion in the Coahuilan Semidesert, Mexico.

					Journal of Forensic Sciences 55: 1098-1011.
Diptera: Calliphoridae	<i>Lucilia eximia</i> , <i>Cochliomyia macellaria</i>	~3-3.5 h – nocturnal under artificial light	Spring and Summer: Texas, USA	Reference Table 1	Kirkpatrick, R. S., and J. K. Olson. 2007. Nocturnal light and temperature influences on necrophagous, carrion-associating blow fly species (Diptera: Calliphoridae) of forensic importance in Central Texas. Southwestern Entomologist 32: 31-36.
Diptera: Calliphoridae	<i>Lucilia sericata</i> , <i>Cochliomyia macellaria</i> , <i>Calliphora vicina</i> , <i>Calliphora vomitoria</i>	8-105 minutes	Michigan, summer 2007	Table 3 Environmental conditions during the summer of 2007 for the time of first fly appearance in the field and time of oviposition	Zurawski, K. N., M. E. Benbow, J. R. Miller, and R. W. Merritt. 2014. Examination of nocturnal blow fly (Diptera: Calliphoridae) oviposition on pig carcasses in mid-Michigan. Journal of Medical Entomology 46: 671-679.
Diptera: Calliphoridae				Except for the coldest days of the year, calliphorids occurred within the first 30 s after removing the carcasses from the plastic bags. High temperatures above 30°C were experienced	Gruner, S.V., D.L. Slone, and J.L. Capinera. 2007. Forensically important Calliphoridae (Diptera) associated with pig carrion in rural north-central Florida. J. Med. Entomol. 44: 509-515.

STATEMENT: Judging by the scientific literature, no forensic entomological experiment has been performed in or near Las Vegas, NV, and no forensic entomological experiment duplicated the physical setting of the location where Mr. Bailey's remains were found. In reference to this investigation, Rusch et al. (2019, the list of authors includes Dr. Jeffery Tomberlin), discussed the practical implications of such a lack of reference data.

“Although this explanation [That the lack of insects associated with the victim's remains indicated death occurred after sunset.] is certainly plausible, it is important to consider that Las Vegas, NV, USA is the #1 urban heat island in the United States (Kenward et al., 2014) and the body was found in July on concrete and surrounded by brick walls, which get much warmer than air temperature during this time of year (Myint et al., 2015). Thus, if the temperature of the materials surrounding the body, or the temperature of the body itself, was above the thermal tolerance of carrion-feeding insects, an alternative explanation for the lack of insects present is simply that it was too warm for them to be active on or around the body.”

As shown above by the quote from Rusch et al. (2019), it appears that Dr. Tomberlin has changed his opinion concerning the postmortem interval in this case.

RESPONSE: The reliance, given certain limitations, on data from previous published studies is common practice in science as Wells demonstrates with his comments regarding blood or wounds as attractants. In both instances, Wells relies on previously published data to draw conclusions or formulate hypotheses. The same approach is being applied in this case by myself.

Furthermore, the hypothesis presented by Rusch et al. (2019) indicates temperatures could have exceeded the upper thermal limits of arthropods of forensic importance at the scene in question with this case; however, it should be noted that this hypothesis is simply that- hypothesis. Given temperatures are expected to be cooler prior to sunrise and would cool down after sunset, arthropod activity would have been expected.

To date, no studies have examined the upper thermal responses of blow flies, much less any other arthropod associated with carrion in Las Vegas.

In this case, reliance on previously published data is necessary. As pointed out, insect activity can occur during temperatures similar to those recorded for the case in question which challenges the veracity of the Rusch et al. (2019) hypothesis. In addition, as pointed out in table 1, arthropod activity during temperatures recorded for the period in question have been experienced in other locations (see reference to citations presented by Wells as well as Mashaly et al. (2018)- temperatures for *urban* and *desert sites* were **40 to 45°C daily**, respectively. Ants were collected at remains on day one at both locations.

STATEMENT: EXPERT WITNESS TESTIMONY FROM THE COURT TRANSCRIPT

DR. JEFFERY TOMBERLIN. OCTOBER 10, 2017.

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When asked, “And what is the distance that a blowfly travels to a decomposed body?” Dr. Tomberlin stated, “There is a lot of work showing blowflies can travel miles . . . to locate resources.” This is a line of questioning that was repeated with other witnesses, and I interpret it as an attempt to argue, incorrectly, that under favorable environmental conditions a corpse will always be detected and infested with carrion insects because of the insects’ incredible powers of olfaction.

Dr. Tomberlin did not specify a publication or author, but the scientific literature does include descriptions of experiments in which blow flies that had been marked, such as with a colored dye, were released and then recaptured miles from the release site. However, these studies provided no evidence concerning the insects’ motivation for making the journey. Instead, they simply documented a distance travelled. There are no published data that justify any statement about the distance from which a blow fly can detect the odor of a corpse and follow that odor to the body.

One of these mark-release-recapture experiments is likely the source of testimony on this topic by Drs. Anderson and Kimsey, so I will use it to illustrate how the science may be interpreted. Braack and Retief (1986), working in South Africa, labeled thousands of flies in the genus *Chrysomya* (although they wrote “*Chrysomyia*,” a spelling now considered to be incorrect) by feeding them radioactive phosphorous shortly after they emerged from the pupal stage. The radioactive flies were then released into a rural environment. Flytraps baited with decayed meat were installed at locations a variety of distances from the release point starting one week or more after the release date. Flies captured in a trap were assayed for radioactivity to identify a fly that had moved from the release site to the trap. The maximum dispersal distance demonstrated in this way was 63.5 kilometers (39 miles) by the species *Chrysomya marginalis*. These insects were found in traps that were installed 13 days after the flies were released. Because during a substantial amount of the time after release the source of odor that eventually attracted the flies did not exist, even if these flies did detect the traps from the moment they were set up it cannot be known where the flies were at the time the traps were installed.

As noted in the previous paragraph, these observations show only that an adult blow fly traveled a certain distance across the landscape. They tell us nothing about the distance from which a blow fly will detect and then travel to a fresh corpse. Furthermore, as is usually true for an experiment such as this, the bait did not mimic a fresh corpse because it was decayed at the time the trap was set up. This is typical when trapping blow flies because fresh (undecayed) flesh is much less attractive than decayed flesh, so putrid bait is used to increase capture rate.

RESPONSE: Wells is correct in his assumption that I was not indicating blow flies, or any other arthropod, were detecting and responding to a resource from a long distance. He is also correct in describing experiments where blow flies have travelled long distances from a release point and

been collected. Resources that seem isolated to a person are not so when considering the ability of insects, such as blow flies, to travel long distances during which time detecting, locating, colonizing, and utilizing carrion sources can occur. Furthermore, it should be noted that blow flies spend a large amount of their time searching for oviposition sites (Bhadra et al. 2014- Table 2).

Table 2. Blow fly dispersal and response to resources.		
Blow flies	‘Female flies of the Calliphoridae family spend a considerable part of their active time in search of fresh carrion, <i>not only for feeding</i> but also for oviposition.’	Bhadra, P., A.J. Hart, and M.J.R. Hall. 2014. Factors affecting accessibility to blowflies of bodies disposed in suitcases. Forensic Sci. Inter. 239: 62-72.

STATEMENT: When asked how the condition of the body might impact carrion fly activity, Dr. Tomberlin stated “From a forensic perspective, if there’s blood present, that’s going to serve as an additional signal. That’s going to attract flies.”

The claim that blood makes a corpse more attractive to blow flies is contradicted by the scientific literature. In my treatment of Dr. Anderson’s report, I pointed out that this not what was observed in a South African experiment (Kelly et al. 2011). Similar negative results from Georgia, USA were reported by Munro et al. (2019). Niederegger et al. (2017), working in Germany, took the additional step of dousing pig carcasses with pig blood before exposing them in the open air. They reported that bloody carcasses were not more attractive to ovipositing blow flies compared to non-bloody carcasses.

RESPONSE: Blood can serve as an attractant for blow flies (Table 3). This concept is not new as it dates back to 13th century China (Amendt et al. 2004). And, in a highly replicated study (Bhara et al. 2014), egg laying occurred 100% of the time when blood was present but no resource, and oviposition occurred 60% of the time within the first hour of availability (Bhara et al. 2014).

Table 3. Blood serving as attractant to blow flies.		
Arthropod	Statement	Citation
Blow flies	‘No obvious evidence could be seen, but one sickle attracted numerous blowflies, apparently because of invisible traces of blood on the blade’	Amendt, J., R. Krettek, and R. Zhener. 2004. Forensic entomology. Natuwissenschaften 91: 51-65.

Blow flies	'... the presence of blood accelerated egg laying compared to water alone.'	Bhadra, P., A.J. Hart, and M.J.R. Hall. 2014. Factors affecting accessibility to blowflies of bodies disposed in suitcases. Forensic Sci. Inter. 239: 62-72.
Blow flies	"...egg laying occurred on 100% (20/20) of zips moistened with blood..."	Bhadra, P., A.J. Hart, and M.J.R. Hall. 2014. Factors affecting accessibility to blowflies of bodies disposed in suitcases. Forensic Sci. Inter. 239: 62-72.
Blow flies	'Within the first hour, 60% (12/20) of the replicates wet with blood had many eggs on them..."	Bhadra, P., A.J. Hart, and M.J.R. Hall. 2014. Factors affecting accessibility to blowflies of bodies disposed in suitcases. Forensic Sci. Inter. 239: 62-72.
Blow fly and flesh fly	'The first wave of insects, especially certain blow flies and flesh flies (Diptera: Sarcophagidae), are attracted to the natural moist body openings, open wounds, and/or pooled blood of the victim where they feed and oviposit.'	Catts, E.P. 1992. Problems in estimating the postmortem interval in death investigations. J. Agric. Entomol. 9: 245-255.

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